

White Paper

April 2005

Z800i

A state-of-the-art and mass market 3G mobile phone



Sony Ericsson

Preface

Purpose of this document

This White Paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables below contain limited information. Additional information and facts will be forthcoming in later revisions.

The aim of this White Paper is to give the reader an understanding of technology and its main applications, as well as the main functions and features of the phone.

Note: This document contains general descriptions for this specific Sony Ericsson mobile phone.

People who can benefit from this document include:

- Operators
- Service providers
- Software developers
- Support engineers
- Application developers

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On www.SonyEricsson.com/developer, developers will find documentation and tools such as phone White Papers, Developers Guidelines for different technologies, SDKs and relevant APIs. The website also contains discussion forums monitored by the Sony Ericsson Developer Support team, an extensive Knowledge Base, Tips & Tricks, example code and news.

Sony Ericsson also offers technical support services to professional developers. For more information about these professional services, visit the Sony Ericsson Developer World website.

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Product Overview

The Z800i is a state-of-the-art 3G mobile phone. The clamshell design is stylish, with a futuristic look and feel. Its technology offers everything needed for a truly advanced mobile lifestyle. And in time for the worldwide roll-out of 3G services for the mass market by major network operators.

It has cutting-edge imaging and entertainment features and the hardware to optimize them. 262K color screen, 1.3 Megapixel Motion Eye™ digital camera with video and a full media player with support for over-the-air audio and video streaming. Video call is the future of mobile communications and the Z800i has it.

Internet is ever present in this innovative device. You can download DRM (Digital Rights Management) protected music from the Web, play 3D games in-phone and online and browse the Internet at full speed wherever you are. E-mail and MMS (Multimedia messaging) are instant-satisfaction experiences with the Z800i due to the impressive data transfer speed of a 3G network.

Ease of use has been of the highest priority when designing the advanced applications in the Z800i. And Sony Ericsson has optimized every application and function to cater for the consumer so they can utilize all the operator services and other functions without difficulty.

The Z800i is a triple band mobile phone, supporting UMTS (Universal Mobile Telecommunications Service) as well as GSM (Global System for Mobile Communications) and GPRS (General Packet Radio Service) triple band 900/1800/1900, GPRS 4+1. It supports voice, circuit switched (cs) data and packet switched (ps) data.

Key functions and features

The evolution of mobile communications towards 3G will greatly increase the scope for new applications and services. 3G brings multimedia into mobile phones, and it is in this area that Sony Ericsson can show its vast experience in consumer electronics and entertainment – music, pictures and games – as well as its mobile technology leadership.

An eye-catching feature of the Z800i is the large 2,2 inch TFT colour screen. It measures 176 pixels wide and 220 pixels high (176 x 220) and has 262,144 colours, allowing high-quality colour imaging and video.

You can listen to sound in the phone via the speaker (earpiece), the loudspeaker, the high-quality stereo headset or other compatible accessories.

The phone has an appealing design, in the form of a clamshell, with the Motion Eye™ camera and an external display that provides status information when the phone is closed. Being a 3G mobile phone, the Z800i is compliant with the 3GPP™ (3rd Generation Partnership Project), R99 December 2002 release.

The Z800i is a triple mode (UMTS and GSM-GPRS) mobile phone. It supports handover (GSM-UMTS, UMTS-GSM) and simultaneous sessions (one voice and one packet data session or two packet data sessions).

3G

3G is going to be the catalyst for a whole new set of mobile services, enabling you to access advanced services anywhere, anytime. You will be freed from the confines of cables, fixed access points and low connection speeds and you will have access to entertainment and on-demand services to a much greater extent than before.

Multimedia (streaming and download)

By streaming media such as audio and video, multimedia is available in real-time with minimal downloading or waiting time. Media can also be downloaded and saved in the phone memory or on

the Memory Stick, and then used with the Media player. Media such as audio files, video clips or slide shows can be played back at any time.

Media player



The Media player makes the Z800i a portable MP3/MPEG4 player. The user can play music and video clips as well as listen to streamed audio and view streamed video. Mega Bass™ is built in for powerful low frequencies and bass reflex enclosures.

When the phone is closed, the media player can be controlled using the volume buttons.

With the dual speakers you can enjoy your music when with the phone opened or closed.

Motion Eye™ camera



With the 1.3 Megapixel Motion Eye™ camera, you always have the camera with you. Take a picture and send it as part of a multimedia message or as an email attachment.



With the video recording format you can also record your own video clips and send them to your friends.

The camera is placed in the clamshell hinge and can be rotated with a simple one-hand grip. Without having to turn the phone around, you are free to take pictures of yourself or of your surroundings.



The Motion Eye™ camera also allows you to participate in a video call with your friend. As it is possible to rotate the camera, you can decide if you want to show yourself or your surroundings during the call.



The camera has a Photo light to improve taking pictures in dimly lit environments.



The camera has a 4x Digital zoom in megapixel mode.

QuickShare™ Sony Ericsson's constant ambition of making products easier to use, has had a great outcome: QuickShare™.

QuickShare™ is the fastest, easiest and smartest ever way to share images. With minimal hassle and just a few clicks, moments can be captured with the integrated camera, and shared with your friends!

But there is more to QuickShare™ than sending images with a picture or email message. QuickShare™ is about ease of use of all the imaging features of the product. Since the Z800i supports Bluetooth wireless technology, images can be shared phone to phone across the room or between a phone and other paired devices such as printers, PDAs or PCs. For example, it would be possible to print a picture directly from the phone using a Bluetooth-enabled printer.

Full graphic 262k colour screen



The large 2.2 inch colour screen, 176 x 220 pixels, of the Z800i enhances viewing, facilitating high-quality multimedia and entertainment.

External display



To provide convenient access to different types of information, even when the phone is closed, the phone is equipped with an external display, placed on the outside of the clamshell. The information in the display is conveyed by icons and text. Typical information that would be displayed includes:

- Signal strength
- Time and date
- Battery status
- CLI (Calling Line Identification)
- Messaging and other alerts
- Calendar appointments
- Media player information (song title, artist, volume, track information with track number, total and remaining track length)

When the phone is closed, the external display can be used as a viewfinder when the user takes a picture.

The external display measures 80 x 101 pixels and displays 65,537 colours. For convenience, the display has a backlight that lights up at incoming calls and alerts, and allows a quick glance at the display information.

It is possible to apply themes including pictures, animations and screen savers to personalize the external display.

Sony Memory Stick PRO Duo™



The Z800i supports Sony Memory Stick Duo™ and the Sony Memory Stick PRO Duo™. The user can store different kinds of content (pictures, audio, video clips etc.) on the Memory Stick and transfer the content to other Sony Memory Stick-compatible consumer products, for example Sony digital cameras, camcorders, portable music players, TVs, photo printers, Playstation 2 and computers.

USB Plug and Play



It is easy to handle PC synchronization and PC connectivity with the USB plug and play.

With the USB Mass storage standard, SEMC PC Synch SW and Adobe™ Photoshop™ Album Starter Edition included it is quick and easy to copy or move files to and from a PC and the Memory Stick of the Z800i.

The user connects the Z800i to the PC via a USB cable and the Memory Stick appears as a drive on the PC. The user drags and drops any supported information to complete the transfer.

MMS



Reacting to the enormous popularity of mobile phone messaging, Sony Ericsson has incorporated the latest messaging standard into the Z800i, along with a colour display for an enhanced imaging experience.

With MMS, there are many interesting applications to subscribe to, for example, stock information, movie trailers and weather reports.

PlayNow™



Content such as music, video and images may be previewed before purchase.

User experience

A unique direct-link to download music, video, games, themes and images, which is easy to use and promises you best-selling content for mobile download.

By selecting PlayNow™, you can, for example, go straight to a live list of Top Music Hits. Choose a song, listen to it, and if you like what you hear, you can buy it and add it to the Sounds folder. You can then listen to it or use it as often as you want.

Content formats that are supported

All formats that are supported in the phone will be possible to download. Music, video and images may be previewed before purchase. The music format is MIDI (Polyphonic 40 voices or more), MP3, WAV or AAC-LC .

How the service works

This service is owned by Sony Ericsson or hosted by Sony Ericsson for a network operator. The PlayNow™ or other premium content is maintained and managed, for example by Sony Music or Sony Pictures. The content on offer can easily be suited to a specific region or operator.

Implementation costs for network operators are minimal and server communication is based on existing, well-established standards. Sony Ericsson offers first or second line support according to the agreement on hosting a white label service or not. High level co-operation is available for the design, look and feel, of content management.

Operator benefits

This service is aimed at providing quality and quantity revenue for network operators. This is truly an ARPU (Average Revenue Per User) driver with low costs for operators. The process involves:

- Downloading a list
- Previewing content
- Choosing content
- Buying content

Note: The availability of this unique application is limited to specific markets, where relevant infrastructure and agreements have been set up.

Other technical details

Security - Server communication is protected by TLS.

Forward lock - Content cannot be exchanged with other devices by the user, it is limited to use or delete.

J2ME™

Download extra content with Java™, for example, new information- and entertainment-based applications. This gives users a chance to personalize the functions and features in their phones, and developers the opportunity to create new applications.

To save memory space, it is possible to save Java applications on the Memory Stick. Users run the application as they would from the phone memory. This also opens up for application developers to put applications on Memory Sticks that can be inserted directly into the phone.

Gaming



Gaming is already a very popular feature in mobile phones, and with Java, users can add new games and skill levels to further enhance the entertainment value of Sony Ericsson phones.

3D Games



Java 3D™ gaming software introduces and supports cutting-edge 3D graphics. Audio developments such as 72 tones polyphonic sound and force feedback provide a much richer experience. With operator support, it is possible to play multi-player games against friends. The large 2.2 inch TFT screen adds to a lasting gaming experience. Downloading graphics-intensive games is also possible with matching built-in memory of up to 64 MB.

Bluetooth™ wireless technology



Using built-in Bluetooth wireless technology, the Z800i communicates with other Bluetooth devices via a radio link. Unlike infrared, Bluetooth wireless technology is not dependent on line-of-sight communication.

A device can be connected to the phone using Bluetooth wireless technology up to 10 metres away. For example, the phone can be answered at a distance with a Bluetooth headset, when it rings. The phone could be in a briefcase, a coat pocket or even in another room. Two mobile phones, or a phone and a computer, can use Bluetooth wireless technology to exchange data such as images, video clips, business e-cards, music files and calendar data.

Copyright protection – DRM

DRM (Digital Rights Management) assures the rights and copy protection of downloaded content (audio, pictures, ringtones, video, entertainment features such as games etc.).

Content-based services have great market potential, and to encourage this, Sony Ericsson plans to support DRM in all future multimedia products. Sony Ericsson regards DRM as a key enabler for content-based services, and is active in supporting the ongoing standardization work of the OMA (Open Mobile Alliance). Furthermore, any additional market requirements for DRM will be monitored.

More in-phone functions

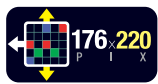
Usability

Navigation key



The easy-to-use 4-directional + select navigation key is designed to easily navigate the menu system. In a menu, it can be pressed to select a feature. It can also be used as a joystick with games.

Improved user interface (UI)



From standby, the phone features a user interface built on the “desktop” concept, which is widely used in many computer operating systems. Navigation between the applications is done by selecting icons representing the different main functions of the phone.

Selection keys and the key assignment give a very efficient interaction design with full flexibility to handle all the new features and applications. Sony Ericsson has focused on user-centred design and extensive usability testing to solidify the new UI paradigm. This ensures visibility in actions and system status and consistency between applications and similar actions. The large, high-resolution colour screen is easily navigated with the navigation key. With the external display, only a quick glance is needed to give you status and message info when you are on the move.

Setup wizard

The setup wizard enables the user to quickly and easily prepare the phone for use.

At the first start-up, the setup wizard starts and helps the user with some core settings whilst giving hints about the functionality of some important keys.

The setup wizard includes:

- setting the language
- setting time and time format
- setting date and date format
- setting the standby time
- the possibility to import contacts from a SIM card
- tips about the **Back** and **C** keys.

Polyphonic sounds - 72 voices

Polyphonic sounds and the MIDI format have revolutionized the sound quality of ringtones in mobile phone. With this format, the user can play, compose, edit and send melodies by using the MusicDJ™. The built-in synthesizer uses wavetables, real instrument sounds, with 72-voices polyphony. The new composer has an improved graphical user interface to simplify melody handling. All new and edited melodies are stored in MIDI format.

File manager

In the Z800i, there is a file manager available, similar to that found on many computers. In the File manager, the user has an overview of the contents of the phone as well as how much memory is allocated to each function and feature. The user can also see if the contents are stored in the internal memory (phone memory) or the external memory (Memory Stick), and can transfer content between them.

To improve the ease-of-use, a number of predefined folders are available that help the user to sort the information that is saved in the phone's memory or on the Memory Stick. For example, in the Pictures folder on the top level in the File manager, all snapshots that are taken using the Motion Eye™ camera will be saved. All ringtones are collected in a similar sub-folder in the Sounds folder.

Animations

The Z800i supports Macromedia® Flash Lite™ 1.1 images as well as SVG-Tiny animations.

The Macromedia Flash Lite player is pre-installed in the phone, allowing users to take advantage of the features of Flash images. Flash images can be embedded as moving objects on a Web page or they can be available as stand-alone Web pages. It is possible to interact with flash images using the navigation key. Flash images can be included in picture messages. The pre-defined Pictures folder in My items, enables users to logically organize their images.

SVG-Tiny is a subset of the SVG standard and has been developed for use with PDAs and mobile phones.

An SVG animation is a text file, based on XML, that contains specific illustration tags and attributes that define how the animation should be presented. The Z800i decodes the tags and the animation is presented in the phone. SVG animation can be included in picture messages. The user can also attach an SVG image to contacts in the phonebook.

Improved Personal Information Management (PIM)

In order to further strengthen the PIM functionality, a number of improvements have been implemented.

- Auto-copy to SIM
- When this feature is activated, the names and phone numbers of contacts that are updated or edited in the phonebook are automatically saved on the SIM card.
- Multi-letter search in Contacts list
- This feature allows users to find the correct contact when browsing in the Contacts list.
- Multiple select in Contacts list
- It is possible to select more than one contact in the phonebook. This is useful if a user, for example, wants to send email to more than one person.
- Email groups
- It is possible to create email groups to enable users to send email to a predefined group of people.
- Presentation of upcoming appointment
- Information about an upcoming appointment will be presented in the external display on the same day the appointment is due.

GPRS (General Packet Radio Service)

GPRS uses Internet-style packet-based technology. GPRS gives the benefit of a permanently available connection to the mobile Internet, but only uses the radio link for the length of time it takes to transfer data. GPRS offers the user the speed needed for satisfactory mobile Internet usability. The Z800i supports GPRS 4+1.

Web browser supporting XHTML™

The Web browser supports the markup languages XHTML Mobile and XHTML Basic. These two subsets of the Web standard XHTML are supported by all major Web browsers. An XHTML page can be viewed in both the phone Web browser and in any standard Web browser. All of the basic XHTML features are supported, including text, images, links, check boxes, radio buttons, text areas, headings, horizontal rules and lists.

In addition to XHTML, the Web browser supports WML. The user can navigate between WML and XHTML pages.

WAP 2.0 also supports cookies, often used by Web sites to store site-specific information in the browser between visits to the site. Cookies are often used by e-commerce sites (in shopping carts

and wish lists for example), and to save the user from entering the same information more than once.

Cascading style sheets (CSS)

Before style sheets were introduced on the Web, developers had little control over the presentation of their Web pages. An XHTML document specifies the structure of the content, which part is a paragraph, which part is a heading, and so on. It does not specify how it shall be presented. Browsers use a default presentation for documents without style sheets. By adding a style sheet to the document the developer can control the presentation of the document, the colours, fonts, and layout.

On the Web, the de facto standard style sheet language is Cascading Style Sheets (CSS), specified by the W3C and implemented in Internet Explorer, Netscape, and Opera. For mobile phones, the OMA has identified a subset of CSS and extended it with OMA specific style rules. The CSS subset and the OMA extensions are called Wireless CSS (WCSS).

The Web browser supports WCSS 1.1.

My friends (Wireless Village)

To ensure interoperability of mobile instant messaging and presence services, Sony Ericsson, Ericsson, Motorola and Nokia have created the Wireless Village Solution, an open standard. My friends is based on Wireless Village protocol version 1.1. The protocol is bearer-independent and can be implemented in different networks. The Wireless Village Instant Messaging and Presence Service (IMPS) includes the features presented below.

Presence

Presence information of other Wireless Village users is received and displayed to indicate their willingness to communicate. The user's own presence information is also sent for others to view. If the user is interested in another person's presence status, he or she can search for this person. If the person is found, the user may subscribe to his/her presence information.

The presence information is displayed in a contact list. Instant messaging means "point-to-point messaging" between Wireless Village users.

Messages are sent to a single user. Short message histories of the communication are logged in a file, which can be read offline. This is a sub-set file of the whole communication and is limited by memory.

Groups

The user may join a chatroom and chat with other participants or members. The sent messages can be seen by all participants in the chatroom. You can have an unlimited number of participants in a chatroom.

Email

With inbox, outbox, save draft and reply options, there are all the functions needed for effective email communication in a powerful mobile phone. Constantly connected to a POP3, SMTP or IMAP4 email server anywhere on the Internet, the Z800i stores messages dynamically, depending on available memory, and updates the inbox automatically and over the air. Check email anywhere. Reply to email on the move. Friends, family and business contacts know that when they send email, it can be received, read and acted on it immediately. Pictures can be included in outgoing email messages and attachments that are received. Hyperlinks in email messages are supported.

Personalization

With themes, it is possible to change many settings in the phone, for example colours, images and ringtones, making it more personal. The phone comes with a number of preloaded themes and pictures, and more can be downloaded and exchanged – sports, movie, seasonal and other themes will be available on Sony Ericsson or operator sites. Other personalizable features are the start-up screen and the screen saver. Specific pictures and ringtones can be set for each separate name in the phonebook.

Technologies in detail

This chapter offers a detailed description of the technologies available in this product. Encompassing a broad and rich range of functionality, they facilitate basic functions such as calling as well as the cutting-edge developments found in entertainment, imaging and connectivity.

3G

Mobile telephony allowed us to talk on the move. The Internet turned raw data into helpful services that people found easy to use in their everyday lives. Now, these two technologies are converging to create third-generation mobile services.

In simple terms, 3G (third-generation) services combine high speed radio access with IP (Internet Protocol)-based services. This does not just mean fast mobile connection to the Web, it means totally new ways to communicate, access information, conduct business, learn and be entertained. It promises liberation from slow, cumbersome equipment and immovable points of access.

Increased 3G data rates, together with extended multimedia and entertainment content, will enhance the use of mobile Internet in a revolutionary way. Gaming, and the ability to store content externally with Sony Memory Stick Duo and Memory Stick PRO Duo, will increase the user benefits even more.

The step towards IP is vital. IP is packet-based, allowing users to be “on line” at all times, having to pay only for the sent or received data. The connectionless nature of IP also makes access a lot faster: file downloads take less time and we can be connected to a network within a few seconds.

3G introduces wideband radio communications, with incredible access speeds. Compared with today’s mobile networks, 3G will significantly boost network capacity, much needed in densely populated areas – thus operators will be able to support more users, as well as offer more sophisticated services.

The Z800i is a dual mode phone. Thus the user will be able to use his or her Z800i without having to think about which system is being used – the handover between the two systems is going to be seamless.

Using 3G scenarios

3G will change our working habits and social lives in many ways. The services that 3G has to offer will help us to manage our personal information, simplify tasks such as grocery shopping, make better use of our time, and offer services that are just fun to use. 3G will also help new, flexible working practices, such as working from home and remote access to corporate networks outside traditional working hours. Operators will be able to develop innumerable new service opportunities to attract and retain new customers:

- Business people can use the time they spend travelling, fixing things that are usually hard to get time for, for example to log on to their bank account, check the balance and pay a few bills - all through their 3G device.
- On vacation, people can make reservations when they get to their destination by using their 3G handset to obtain up-to-date information, including hotel vacancies. Having booked a room, they can use their phone to view video

clips of local tourist attractions and talk to someone from the local tourist information bureau at the same time.

- Anyone wanting to hire a film, or go to the cinema can quickly download a trailer to decide which film they want to see.
- People travelling on business can use their 3G mobile phone to hold a phone meeting with their colleagues and, at the same time, view the draft presentation and make changes on line.
- A maintenance engineer, repairing some equipment at a client’s premises, has a problem. Using his 3G mobile phone, he can contact his department and then download a demonstration video that guides him through the repair process.
- People can easily share a moment with their friends and family in other geographical sites by capturing the moment with the video recorder and then sending them the video clip in a picture message.

Multiple sessions

With regard to simultaneous connectivity, multiple sessions, Sony Ericsson supports the 3GPP™ specification 3GPP TS 22.101 which states that 3GPP™ specifications shall enable the user of a single terminal to establish and maintain several connections simultaneously. It shall efficiently cater for applications which have variable requirements relating to specific QoS (Quality of Service) parameters (for example throughput) whilst meeting other targets.

Examples of use cases in 3G mode

- One voice and one packet data session:

Photo: A voice call is connected, a photo is taken with the integrated camera and sent, either via MMS or via email.

- Two simultaneous packet data sessions:

Streaming: A WAP browsing session is ongoing, an audio or video clip streaming session is started, for example from a “hyperlink”.

Gradual change and development of 3G

The third-generation is a technology shift taking mobile telephony to a higher level. The term describes a new generation of wireless systems that offer services and functions far beyond the era when mobile phones were used for voice calls only.

When taking GSM customers into the world of 3G, operators will not have to switch their networks from one system to another. The move from 2G to 3G optimizes the existing infrastructure, enabling it to co-exist with the new WCDMA system.

GSM equipment – enhanced with GPRS – and its functions will continue to exist within the 3G system. Old and new technology will complement each other and form a highly flexible network system, with a capacity that gives new meaning to mobility.

Even when WCDMA is fully expanded, GSM-based parts of the network will continue to play a crucial role in serving the operators’ needs for capacity. All spectrum assets will be valuable, as there will be a substantial increase in both the number of subscribers and the volume of traffic in the networks. With a seamless solution, operators will have a flexible network where the systems interact according to current demand.

User experience

For the consumers, using a network consisting of GSM, GPRS and WCDMA parts will be a seamless experience. GPRS allows qualified mobile Internet applications, while the introduction of WCDMA brings a whole new set of user services, using the full potential of wideband data transport.

GSM and WCDMA development

Building the network

The combining of GSM with GPRS, and the introduction of WCDMA technology in a new spectrum, can be done gradually. The new wideband technology can be deployed in parallel with the enhancement of the existing spectrum, re-using parts of the GSM infrastructure.

How 3G works

3G brings together two powerful forces: wideband radio communications and IP-based services. Together, these enable advanced multimedia services.

Making 3G a reality depends on technology developments in different areas. These include amendments to the radio interface to support wideband communications, as well as amendments in the core network. Supporting technologies such as WAP, Bluetooth wireless technology, Java, MMS and streaming, are also important.

GPRS

Short for General Packet Radio Service, GPRS is a standard for wireless communications.

GPRS provides packet data, rather than circuit switched data. This means that as a user you pay for data sent and received, and not for time spent online. There is, more or less, a permanent connection at all times.

GPRS is implemented by adding new packet data nodes and upgrading existing nodes, to provide a routing path for packet data between the mobile terminal and a gateway node. The gateway node will provide interworking with external packet data networks for access to the Internet and intranets.

Benefits

- Faster data speeds and “permanent connection” mobility.
- Instantaneous connection set-up.
- Connection to an abundance of data sources around the world, through support for multiple protocols, including IP.

WCDMA

WCDMA (Wideband Code Division Multiple Access) is a wideband radio technique that provides far higher data rates than other radio techniques available today, up to 384 kbps, and highly efficient use of radio spectrum.

The higher bandwidth that WCDMA provides will deliver the full potential of 3G. For example, WCDMA allows simultaneous access to several voice, video and data services.

WCDMA is fully compliant with IMT-2000 (International Mobile Telecommunications-2000) and is the air interface technology for standards in the 2 GHz band (the IMT-2000 core band), known as UMTS (Universal Mobile Telecommunication System) in Europe and ARIB (Association of Radio Industry Businesses) in Japan.

UMTS

UMTS and WCDMA are often used as synonyms. The European Telecommunications Standard Institute (ETSI) chose the name UMTS to define the system when positioned in the 2.1 GHz band, which will be the case in Europe and other parts of the world where this frequency is available. In the Americas though, WCDMA will have to use other parts of the frequency band.

UMTS is part of the International Telecommunications Union's IMT-2000 vision of a global family of 3G mobile communications systems. UMTS includes WCDMA radio access technologies together with a core network specification based on the GSM/MAP (Mobile Application Part) standard. Please visit the 3GPP™ site for more information at www.3gpp.org.

Handover/service continuity

The scope of this text includes service requirements for handover maintaining continuity of service to a wireless terminal, as it moves between the radio coverage area, or “cells”, associated with different base station sites. This functionality is called “handover”. It is a key requirement to allow for dual

or multi-mode terminals to handover traffic from UTRAN to other radio systems such as GERAN and vice versa.

This part describes the general principles for service continuity within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio

Access Network and other radio systems such as GSM/GPRS. As a principle, the requirements on service continuity characteristics should be according to the target network on which the service is maintained.

Service continuity

Service continuity should support the following scenarios:

- Continuity of active circuit switched services when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.
- Continuity of active and packet switched sessions when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.

General operational considerations

Mechanisms defined to support service continuity between different radio systems or radio access modes should effectively cope with a number of coverage scenarios:

- Limited coverage in a “sea” of coverage provided by another radio system or radio access mode.
- Selective operation at a geographical boundary, with extensive UMTS Radio Access Network coverage on one side, and extensive coverage from another radio system on the other side.
- Geographically co-located areas of UMTS Radio Access Network coverage and another radio system.

Performance requirements

Temporary degradation of service caused by handover

During intra-UMTS Radio Access Network handover or handover from UMTS Radio Access Network to GSM/GPRS, degradation of service should be no greater than during intra-GSM/GPRS handover.

The duration of the discontinuity experienced by packet switched and circuit switched real time services should be shorter than that in the handover of voice calls over GSM/GPRS.

Requirements on multiple bearer services handover from UMTS Radio Access Network to GSM/GPRS

Consideration must be given to services that may involve multiple bearer services (and simultaneous sessions). The mapping between UMTS Radio Access Network bearer services and GSM/GPRS bearer services depends on many factors such as data rate, delay constraints, error rate etc. In the event that certain UMTS Radio Access Network bearer services cannot be handed over to GSM/GPRS, the handover of some of the bearers to maintain the service should not be precluded.

In the case where a user equipped with a dual mode terminal is in UMTS Radio Access Network coverage, and has multiple PDP contexts activated (for instance to support multimedia), then it is preferable to handover one PDP context, rather than dropping all of them.

As a first priority only the PDP contexts which have an associated QoS that can be supported by the GSM/GPRS should be candidates for handover.

If there are still multiple PDP contexts as “handover candidates”, then the operator should choose which PDP is maintained. When roaming, the serving network should make this decision. The operator may choose to either:

- Drop all of the PDP contexts.
- Choose one based upon criteria such as duration, amount of traffic transferred, etc.

Handover in the Z800i

This phone is compliant with the 3GPP™ R99 December 2002 release.

GSM to UMTS

The product supports circuit switched voice handover from GSM to UMTS.

UMTS to GSM/GPRS

The product supports packet switched data handover and circuit switched voice handover from UMTS to GSM/GPRS.

GPRS

The introduction of GPRS was a big step in the evolution of the GSM networks for enhancing the capabilities of data communication. Data traffic has increased (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that of mobile communications.

We can now see that the demand for high-speed Internet access is the key driver for coming generations of wireless multimedia and entertainment services, and GPRS is important as a stepping stone when we enter the 3G network era. GPRS has allowed innovative services to be created and granted access to new and previously inaccessible market segments, which will be further developed with 3G.

GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS have been deployed on a large scale and have thus reaped the associated benefits.

With GPRS, the Z800i sends data in “packets” at a very high speed. The Z800i remains connected to the network at all times, using transmission capacity only when data is sent or received.

Instead of occupying an entire voice channel for the duration of a data session, the Z800i sends and receives data in small packets, as needed, much like IP on the Internet. Thanks to this, the phone is always online, using transmission capacity only when data is sent or received. The Z800i is compatible with GPRS R99.

The GSM system limits the ability to use all eight time slots, so the Z800i uses up to four time slots for receiving data, and one slot for transmitting.

Information about the identity of the phone and the characteristics of the connection are described in the PDP (Packet Data Protocol) context. This information is stored both in the phone and in the mobile network, so that each phone is identified and “visible” to the system.

Using GPRS with the Z800i has many advantages, for example:

- **Constant connection**
Keep an open connection to an email system or the company network, staying online to receive and send messages at all times. All connection settings can be managed by using the data connections feature.
- **High speed**
Gain access automatically to increased bandwidth when downloading large files, images etc.
- **Cost efficient**
Use transmission capacity only when needed, thus reducing costs.
- **WAP over GPRS**
Access the Internet via WAP at high speed and with a constant connection.
- **Email over GPRS**
Remain connected to an email system while reading and preparing messages, (which are then sent at high speed).
- **Data communication**

- Transfer data and access the Internet or an intranet with a PC, PDA or handheld device connected via Bluetooth wireless technology, infrared or cable.
- Data and voice
Maintain a data connection when conducting a voice call.
- Provide settings
Receive GPRS configuration settings from the provider OTA (over the air), making manual configuration unnecessary.
- User-controlled settings
Take advantage of full user control in the data connections menu, establishing multiple descriptions and accessing advanced settings for GPRS.

Standards, architecture and protocol

The architecture, protocols and codecs for PSS (Packet Switched Streaming) follow the 3GPP™ specifications to ensure interoperability between business solutions. Sony Ericsson fully supports the 3GPP™ standard, but will also meet the market requirements of supplementary formats and codecs.

Figure 1 shows the functional components of a PSS client.

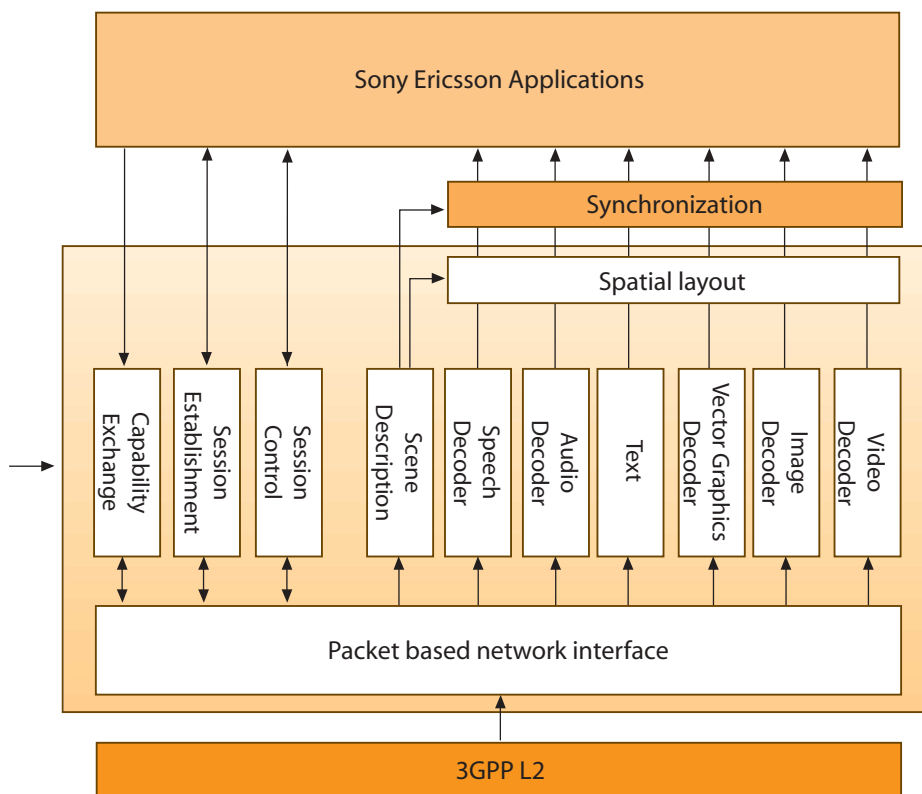


Figure 1. Functional components of a PSS client

Figure 2 gives an overview of the protocol stack used in a PSS client and also shows a more detailed view of the packet based network interface.

The functional components can be divided into control, scene description, media codecs and the transport of media and control data.

TS 26.233 “Transparent end-to end packet switched streaming service (PSS); General description” defines the simple and extended PSS.

The control-related elements are session establishment, capability exchange and session control.

- Session establishment refers to methods of invoking a PSS session from a browser or directly by entering an URL in the user interface of the terminal.

- Capability exchange enables choice or adaptation of media streams depending on different terminal capabilities.
- Session control deals with the set-up of the individual media streams between a PSS client and one or several PSS servers. It also enables control of the individual media streams by the user. It may involve VCR-like presentation control functions like start, pause, fast forward and stop when presenting media.

The scene description consists of spatial layout and a description of the temporal relation between different media that is included in the media presentation. The first gives the layout of different media components on the screen and the latter controls the synchronization of the different media.

The PSS includes media codecs for video, still images, vector graphics, text, audio, and speech.

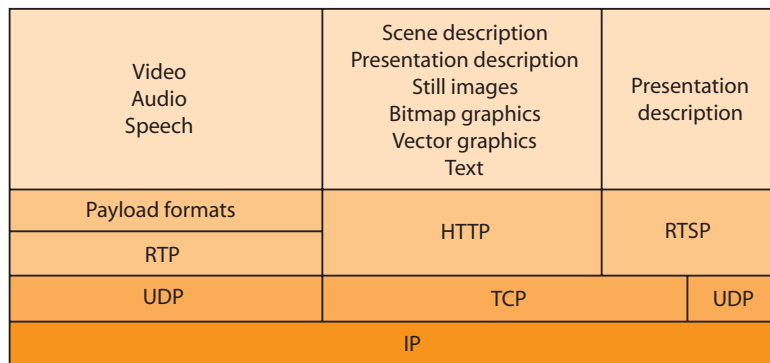


Figure 2. Overview of the protocol stack

Figure 2 describes the media transport protocol stack. Transport of media and control data consists of the encapsulation of the coded media and control data in a transport protocol. This is shown in figure 1 as the “packet based network interface” and displayed in more detail in the protocol stack of figure 2.

Entertainment

Media player

The media player supports different audio and video formats, streaming, as well as download and playback.

Playlists

One of the most central media player features is the use of play lists. This feature allow users to easily access locally stored music and movie files along with online streaming media. It is possible to create, sort or manage playlists using media files that are stored on the Memory Stick or in the phone memory.

Playlists relieve the user of handling their media files directly through the file browser enabling music tracks to be moved or removed to multiple lists without affecting the file structure.

This reinforces the role of the media player as a competitive product to standalone MP3 players as well as an entertaining application to just play around and be creative with.

Auto Generated Playlists

There are two automatically generated playlists in the media player; All music and All video. These playlists differ from others in that they cannot be deleted, edited or renamed and that they update themselves by browsing the Sound/Video catalogue. These playlists contain all available sound and video files in the phone memory and on the Memory Stick.

To avoid including ringtones in the All music list, all ringtones have been collected in a separate ringtone folder. The All music list ignores all files in the Ringtones folder.

Navigation

When accessing the media player from the desktop, a list of available playlists is presented including All music and All video. Additionally, there is one customizable Direct Link. Any user-created playlists follow in alphabetical order.

Minimize

To be able to use other phone features while running a playlist, the user can minimize the media player GUI, just like any program on a PC. This is indicated with a minimized icon in the status bar. In minimized mode, the Media player responds to any events coming from the additional accessory developed for the Z800i media player.

Play modes

The media player has two different play modes: random and loop.

- Random plays a randomly selected file from the current playlist. Played files are de-selected and not repeated.
- Loop restarts the playlist when reaching the last item in the list.

DRM protection

In the Z800i the following types of DRM protection are used: FWL, CD and SD. All protection types can be applied on MP3, AAC and MPEG4 files.

- FWL – Forward Lock
Places the file in a shell with information preventing it from being further distributed.
- CD – Combined Delivery
Places the file in a shell with information preventing it from being further distributed. Additionally, this shell contains a license field where the distributor could add a number of limitations. These limitations are preventing the file from being played more than a set number of times, only letting the file be played between two dates or points of time or letting the file be played a set number of days/hours using the first play time as offset.
- SD – Separate Delivery
Encrypts and places the file in a shell with an included ID. An additional file contains the same type of license field as Combined Delivery with a key. The file can only be unlocked for use

through WAP Push to a predefined server, comparing ID. The file is not allowed to be distributed.

It is possible to play unprotected files in the Media player.

In Japan, only files with SD protection for playback will be accepted in the media player.

Music

The Media player is a multi-format digital audio player which enables the user to carry and play a selection of favourite songs. A range of audio formats are supported:

- **AAC**
Advanced Audio Coding. AAC is the latest audio coding standard, defined in the MPEG-2 standard and is used for high-quality audio compression. AAC provides higher quality than MP3 at the same bit rate, or for the same audio quality it uses a 30 per cent lower bit rate. It supports the coding of multichannel audio, with up to 48 main channels and 16 low-frequency channels. The AAC offers three different profiles to facilitate trade off between quality, memory and processing power requirements. They include: Main Profile (MP), Low Complexity (LC) and Scalable Sampling Rate (SSR). AAC-LC is also supported.
- **AMR**
Adaptive Multi Rate. A medium quality compressed sound format. AMR-NB (Narrow Band) and AMR-WB (Wide Band) are supported.
- **MIDI**
Musical Instrument Digital Interface.
MIDI is not a recording of music, but a description which enables a local synthesizer to play the music from the instructions included in the MIDI file. Since a MIDI file only represents player information, it is far more concise than formats that store the sound directly. An advantage is very small file sizes. A disadvantage is the lack of specific sound control. MIDI is ideal for polyphonic ringtones.
- **XMF**
eXtended Music Format
XMF is a technology for collecting other music and sound resources, such as Standard MIDI Files, DLS instrument files, WAV or other digital

audio files. XMF does not describe musical notes, notation, instrument sounds or audio recordings. Instead, it allows content creators a method to collect all those elements and put them in a single file. In the end this means easier handling and more consistent predictable playback.

- **MP3**
MP3 is the file extension for MPEG audio layer 3. Layer 3 is one of three coding schemes (layer 1, layer 2 and layer 3) for the compression of audio signals. Layer 3 uses a very efficient compression method, removing all irrelevant parts of a sound signal that the human ear cannot perceive. The result is, for example, CD digital audio (CDDA) converted to MP3 with almost untouched quality, compressed by a factor of around 12. The high compression of audio in MP3 files makes them relatively small, though MP3 files can be created with different size and quality compromises. The small file size, together with the excellent sound quality, are the main reasons for the MP3-format's massive popularity when sharing music over the Internet.
- **WAV**
Windows media audio. A wave file is an audio file format created by Microsoft, that has become a standard PC audio file format for everything from system and game sounds to CD-quality audio. A wave file is identified by a file name extension of WAV (.wav). Used primarily in PCs, the wave file format has been accepted as a viable interchange medium for other computer platforms, such as Macintosh. This allows content developers to freely move audio files between platforms for processing, for example.

In addition to the uncompressed raw audio data, the wave file format stores information about the file's number of tracks (mono or stereo), sample rate, and bit depth.

Songs may be stored in the internal phone memory as well as on the Memory Stick. The folder system enables the user to organize songs into groups and create simple playlists of MP3 songs. It also allows songs to be moved between internal memory and the Memory Stick.

Songs may be collected in numerous ways, including Internet download, file transfer from the PC and, of course, via the Memory Stick.

The media player is intelligently aware of other applications in the Z800i:

- Playback is paused when a telephone call is made or received.
- Playback is paused if the user starts another application which requires the audio channels to be dedicated to it.

Polyphonic ringtones

Background

The word “polyphony” means producing several tones at the same time. Almost all music that we listen to consists of polyphonic melodies.

Early Ericsson mobile phones supported a proprietary non-polyphonic format called eMelody. Due to the musical limitations of eMelody, and the popularity of creating, sending and downloading ring melodies, Ericsson and Sony Ericsson, together with other manufacturers, created the more advanced but non-polyphonic sound format - iMelody.

The introduction of the MIDI format revolutionized sound quality. MIDI files are small, and perfect for mobile devices, which have limited storage capacity.

MIDI is a specification for a communications protocol principally used to control electronic musical instruments. MIDI is today a well known standard used by many musicians, composers and arrangers.

A MIDI signal or file does not contain any music. It contains binary data (information) of how a melody is played and when this data reaches a synthesizer, the synthesizer will translate the binary data to music, when connected to an amplifier with speakers so that the sound becomes audible.

Please visit www.midi.org for more information.

MP3/master ringtones

MP3/master ringtones are samples or clips of song recordings produced from master recordings by actual performers. As with polyphonic ringtones, the master ringtones can be downloaded straight to the phone. Shortened and DRM protected MP3 master ringtones are also called music tones.

Today the business is developing around master ringtones. More and more customers personalize their wireless service with ringtones and it is expected that master ringtones will become the de facto standard for mobile music. The user subscribes to the master ringtone service and pay a fee for the master recordings. This means direct deals between carriers and record labels.

With the MP3/master ringtones service integrated in the Z800i, it is possible to use the mobile phone as a music download platform and a portable music player. You are given the choice of using a computer/music player combination versus downloading songs straight to the phone. Using the memory stick it is possible to storage up to two full-length CD's.

This means that in addition of using the standard polyphonic melodies that comes with the Z800i, or recording your own sounds with the sound recorder and use as ringtones, it is possible to download MP3/master ringtones from web sites directly to the Z800i, and to exchange melodies via the infrared port or the USB cable and select an MP3 file as a ringtone.

SP-MIDI

SP-MIDI stands for Scalable Polyphony MIDI. SP-MIDI is based on the MIDI format and adapted for mobile phones and other portable products. The objective is to secure interoperability between products with different sound capabilities.

Initial recommendations for using SP-MIDI in 3GPP™ applications are discussed in a separate document, *Scalable Polyphony MIDI Device 5-24 Note Profile for 3GPP™*.

Video clips

The media player supports download and playback of MPEG-4 and H.263 formats for viewing video clips in the Z800i.

Video clips may be downloaded from the Internet or copied from a connected PC. Video files are large compared to still images.

Files must be of types MP4 or 3GP, having video encoded in MPEG-4 Simple Visual Profile 0 and audio in AAC or AMR format.

The video recorder supports the QCIF (176 x 144 pixels) and sub-QCIF (128 x 96 pixels) formats. The Z800i encodes video clips in H.263 Profile 0 Level 10 format.

Streaming support

The media player can be launched from hyperlinks in the Browser or in messages. Content is streamed using RTSP (Real Time Streaming Protocol) session control according to 3GPP™ specification.

Streaming

Streaming media is a method of making audio, video clips and other multimedia available in real-time. Streaming media to computers has been used during the last couple of years, and now, with 3G, the technique gives the user a high-quality experience.

The term *streaming* refers to the technique it is based on. Previously you had to wait to download an entire file and then play it, whereas the use of streaming means the end user can almost immediately begin to watch or listen to the content of a requested file. The data in the file is broken down into small packets that are sent in a continuous flow, a stream, to the end user. It is then possible to begin viewing the file while the rest of the packets are transferred.

Applications

The applications which can be built on top of the streaming services, can be classified into on demand, and live information delivery applications. Examples of the first category are music and video clips, news on demand as well as on demand instruction material. Live delivery of radio and television are examples of live information delivery.

The following video and music codec support is provided according to 3GPP™:

- MPEG-4 Simple Visual Profile Level 0
- H.263 Profile 0 Level 10
- H.263 Profile 3 Level 10 (decode only)
- AAC
- AMR

Streaming of live traffic information (broadcast)

Nick wants to know if there is a traffic jam on the highway before he heads for home. He browses the

Examples of usage

Streaming of music (on demand)

Anna browses to a Web page to check out the latest top ten list of pop music. She wants to see if there are any new cool songs. She selects a few songs, streams the music to her mobile phone and listens to the songs through the stereo headset or via the built-in loudspeaker.

Streaming of news (on demand)

Bob browses to a morning paper's Web page to check the news. He wants to see the five-minute version of the latest financial news. The news is streamed to his phone, and he can watch it on the bus on his way to work.

Streaming/download of music video (on demand)

Mika browses to a music Web page to check out the latest rock videos. He finds a video he wants to watch, so he clicks the link and then streams a one-minute version of the video. He then decides to download and pay for the complete video.

A memory check is automatically performed to make sure that his mobile phone has enough free memory.

Streaming of live radio (broadcast)

Linda wants to check out and listen to a favourite radio station. She browses to the home page and starts to stream the content. The content is audio or audio with pictures of the artist.

page for local traffic information. There is a traffic jam, so he takes an alternative route home.

User-created content (Web album)

Sheila and Tom are on vacation. They want to show their friends how fantastic the beach is. They record a video clip and upload it to a Web album. Their friends can then stream or download the clip to their PC or mobile phone.

Market and revenue possibilities

As streaming means “seeing the product without having it”, it can be extensively used in the music and film industry. There are also great revenue possibilities for subscription-based content; for example, the user can subscribe to several on demand services such as news and traffic information.

Gaming

Gaming is now seen as a standard feature in mobile phones, where Sony Ericsson promises to be a step ahead in this regard. This is not only due to faster download capability on the network. There are some other reasons why the actual gaming experience is better – the way Java has been implemented, the fact that more processing power has been dedicated to the games, the large 262k colour screen and more sophisticated graphics with Java 3D and the Mascot API. The result is

games with improved graphics that react faster to user commands when using the navigation key as a joystick or game controller. The phone takes mobile gaming to new heights.

Supporting J2ME (Java 2 Micro Edition), the phone lets users download and run new games and applications. This is a great way to upgrade the game gallery, install work-supportive programs and personalize the phone.

SMIL

SMIL stands for Synchronized Multimedia Integration Language and is pronounced “smile”. SMIL is an advanced XML-based protocol, and Sony Ericsson’s MMS implementation supports a subset of the SMIL 2.0 protocol according to OMA MMS IOP document version 1.2.

The use of SMIL in a product allows the user to create and transmit slide shows in the style of Microsoft® PowerPoint® presentations on the mobile device. Using a media editor, users can incorporate text, audio, images, video clips and animations to assemble full multimedia presentations. The user can decide in which order the image and text will be displayed, as well as for how long the images and text lines are to be shown on the display.

Media types

There are certain media formats that support continuous media (speech, audio and video). The following media types are supported for SMIL:

- AMR wide band speech codec MIME media type

- MPEG-4 AAC audio codec MIME media type
- MPEG-4 video codec MIME media type
- H.263 video codec MIME media type

The media types for JPEG and GIF can be used both in the 'content-type' field in HTTP and in the “type” attribute in SMIL 2.0. The following media types are to be used:

- JPEG MIME media type
- GIF MIME media type

All these media are pointed out by MIME (Multipurpose Internet Mail Extensions) types.

Imaging

The Motion Eye™ Megapixel camera

Megapixel camera

With the integrated Megapixel Motion Eye™ camera, the user can take pictures and video clips and store them in the phone memory or on the Memory Stick. The user can send them as an attachment in an email or a picture message. The picture can also be sent via Bluetooth, infrared or cable.

Taking a picture

To activate the camera application, the user presses the dedicated camera button, or selects the camera function on the desktop. A large viewfinder is presented to the user.

It is possible to take still pictures when the clamshell is closed. In this case the external display is used as a viewfinder.

For the best close-up pictures, up to 4x linear digital zoom is supported.

Panorama pictures

The camera can create panorama pictures by combining several different pictures into one large picture. This is done with the help of a unique image processing technique.

Using this feature is very user-friendly. The user simply takes a picture and then moves the camera slightly sideways and then takes a new picture.

Up to three pictures can be taken. Then the user selects to save the panorama where all the different pictures are combined.

Recording video clips

When the camera application is running, the user can switch between camera and video recorder with the navigation key. In the video recorder, two shoot modes are available:

- For picture messages. Video clips recorded in this mode are limited in length and video quality to allow the clip to be sent in an MMS.

- High quality video. Video clips shot in this mode will have the highest possible quality and are restricted in size only by available space on the Memory Stick (or in the internal phone memory if no Memory Stick is present).

Image formats

Camera pictures can be sent in the following resolutions:

- Small - QQVGA (160x120 pixels)
- Medium - VGA (640x480 pixels)
- Large - SXGA (1280 x 1024 pixels)

Video format

Video clips can be played and sent using the following codec:

- H.263
- MPEG-4

Video clips that are recorded, can be saved in H.263 format only.

Auto-exposure control

The camera has a full automatic exposure control that selects the optimal exposure time needed to get an excellent picture. When operating the viewfinder, the camera adjusts the exposure time.

Lighting adjustment

The camera has built-in compensation for “bright skies” that automatically adjusts the brightness of landscape pictures. This avoids the dark and dull images that automatic cameras sometimes give in difficult lighting situations. It is especially effective for outdoor photography on grey and cloudy days.

It is not possible to turn this feature off, but by including more or less sky in the picture, the user can get the compensation feature to turn on or off. This feature can also be used in a creative way to generate different effects in pictures.

Photo light

The camera has six LED lights, positioned around the lens, to improve taking pictures in darker environments. The light allows the user to take a picture in an unlit room. The light is switched on by pressing the light button positioned beside the camera button on the side of the phone.

Video calls

With the camera, located in the hinge, the user can participate in a video call. While the camera is capturing the user, he or she can see the other participant on the screen.

During a video call, it is possible to rotate the camera. This allows the user to show the surroundings as well as him or herself during the call. When the

Motion Eye™ is rotated, the camera image is automatically adjusted to the correct orientation, that is heads up and feet down. The user can also send still images during the video call. This is a great way to share your experience with your friends at the same time as you talk to them.

The speed of UMTS, the Z800i, and video call functionality, bring you as close as you can get when being apart. Like your own live TV broadcast, you can now share the latest news face-to-face with your friends back home.

Note: Video calling using the Z800i can only take place in UMTS networks and with other video-capable UMTS phones that support the 3GPP™ standard 3G-324M.

Messaging

My friends

My friends is an enhanced messaging facility that offers a user-friendly and versatile way to quickly get in touch with contacts.

At a click you can access your list of contacts, and with another click you can choose how you want to communicate with them - via SMS, MMS, email or chat.

The application also enables you to view the 'presence', or availability of the contacts in My friends. You can easily and quickly find out whether they are in a meeting or free to speak to you. You can then choose how you wish to contact them.

My friends contains information about your contacts. You can have:

- a select list of up to 20 people
- their contact information such as phone number, email, chat and mail addresses
- call information - calls to and from them
- presence information - their availability, mood, text or image they choose to show you.

You can present similar information about your own availability and status.

You have access to chatrooms, and can form wireless communities of business associates or contacts.

The main view

You can access the My friends sub-menu by clicking the Messages desktop icon. The icon in the status bar indicates the online status and new, unread messages if any. The most likely action (which is context dependent) is available on the left softkey.

Adding contacts to My friends

You can add a contact from the phonebook to the contact list in My friends, and you can change the position of the friend in the list. This enables you to have your list of immediate business or social contacts at hand, so you can establish easy communication with them almost instantly.

Note: To realise this application's complete potential, access to a Wireless Village server is required.

Managing My friends

Your list of immediate contacts may change to suit business demands. You may need to interact with new sets of people depending on your current project or work at hand. Or you may simply want to alter your list of personal friends whom you want to keep in constant touch with.

You can manage the contact list in My friends to quickly alter the list of contacts that you want displayed. You can sort the names, edit nicknames, block or delete friend, or link a friend to phone-book.

Viewing the status of contacts in My friends

You can view your contact's status and decide how you want to communicate with him or her. You may want to call or send an SMS, MMS, or email, or join your friend in a chatroom.

Presence

Presence information of other Wireless Village users is received and displayed to indicate their willingness to communicate. The user's own presence information is also sent for others to view. If the user is interested in another person's presence status, he or she can search for this person. If the person is found, the user may subscribe to his/her presence information. The presence information is displayed in a contact list.

Access to the chatroom

The My friends application supports creating chatrooms and inviting your friends (on your My friends contact list) to the chatroom.

MMS

Multimedia Messaging uses WAP (Wireless Application Protocol) or http as bearer technology which also can be powered by the transmission technology GPRS. This allows users to send and receive messages that look like PowerPoint presentations. The messages may include any combination of text, graphics, photographic images, speech, music clips and video. MMS will serve as the default mode of messaging on all terminals, making total content exchange second nature. From utility to sheer fun, it offers benefits at every level and to every kind of user.

Over the air (OTA) configuration

Users can easily get MMS into their phone. MMS supports OTA, meaning that the user does not have to configure the settings manually. The configuration is done by the operator via OTA.

Note: The specification is in accordance with Ericsson Nokia OTA configuration v7.1.

MMS objects

Although MMS is a direct descendant of SMS, the difference in content is dramatic. The maximum size of an SMS message is 140 bytes (160 characters), while the maximum size of an MMS message is 300 kB in most 3G networks, 100 kB in GSM networks. Text is limited to 5000 characters per page.

An MMS message can contain one or more of the following:

Text

As with SMS and EMS (Enhanced Messaging Service), an MMS message can consist of normal text. The length of the text is limited to 5000 characters per page.

Audio

MMS provides the ability to send and receive full sound messages. Not only can users share a favourite song or ringtone with a friend, they can also use the mobile phone to record a sound and send it along with a message.

As sound includes speech as well as music, this extra dimension to an MMS message allows for a spontaneous and immediate personal expression communication messaging. Rather than sending a downloaded birthday jingle in EMS, a user can, for example, send a clip of his or her own personal rendition of "Happy Birthday". In the Z800i, the MIDI-format is supported.

Pictures, video clips and themes

By using the integrated camera, users can take a picture or video clip and immediately send it to a recipient.

Themes (downloaded or pre-defined pictures) can also be exchanged via MMS.

PIM communication with MMS

By using MMS, it is easy to handle PIM (Personal Information Manager) information. The user can send and receive business cards (vCard), calendar entries such as appointments (vCal) and notes (vNotes).

Templates

The Z800i comes with a number of MMS pre-defined templates.

Streaming content in MMS

The MPEG-4 file format can be used for continuous media along the entire delivery chain envisaged by the MMS, independent of whether the final delivery is done by streaming or download, thus enhancing interoperability.

In particular, the following stages are considered:

- Upload from the originating terminal to the MMS proxy.
- File exchange between MMS servers.
- Transfer of the media content to the receiving terminal, either by file download or by streaming. In the first case, the self-contained file is transferred, whereas in the second case the content is extracted from the file and streamed according to open payload formats. In this case, no trace of the file format remains in the content that is transmitted over the wire or over the air.

Additionally, the MPEG-4 file format can be used for storage in servers and the "hint track" mechanism can be used to prepare for streaming.

Benefits with MMS

By allowing the mobile terminal to serve as an image processor and conveyor, Multimedia Messaging accommodates the exchange of important visual information as readily as it facilitates fun. Business and leisure usage of MMS will be dynamically merged, resulting in enhanced personal efficiency for users and increased network activity for operators. In short, MMS affords total usage for total communication.

Because MMS uses WAP as its bearer technology and is being standardized by 3GPP™, it has wide industry support and offers full interoperability, which is a major benefit to service providers and end users.

Ease-of-use resulting from both the gradual steps of the messaging evolution and the continuity of user experience gained from interoperability is assured.

The MMS server, through which MMS messages are sent, supports flexible addressing (to both normal phone numbers (MSISDN) and email accounts), which makes the user interface more friendly and allows greater control for operators. The MMS server, moreover, is responsible for the instant delivery feature of MMS.

MMS technical features

The MMS standard, just like that of SMS, offers store-and-forward transmission (instant delivery) of messages, rather than a mailbox-type model. Unlike SMS, the MMS standard uses WAP as its bearer protocol. MMS will take advantage of the high speed data transport technologies EDGE and GPRS and support a variety of image, video and audio formats to facilitate a complete communications experience.

Architecture

The MMS Centre (MMS-C) is comprised of the MMS Server, the MMS Proxy-Relay and the MMS Store. The MMS Centre is the central element of the MMS network architecture, providing storage and operational support, enabling instant delivery of multimedia messages from terminal-to-terminal and terminal-to-email, and supporting flexible addressing. The centre's MMS Proxy-Relay interacts with the application being run on the MMS-enabled terminal to provide various messaging services. WAP and HTTP is used as the bearer of

an MMS message between the MMS-C and the MMS client (application). The WAP Gateway is used for delivery and retrieval of messages.

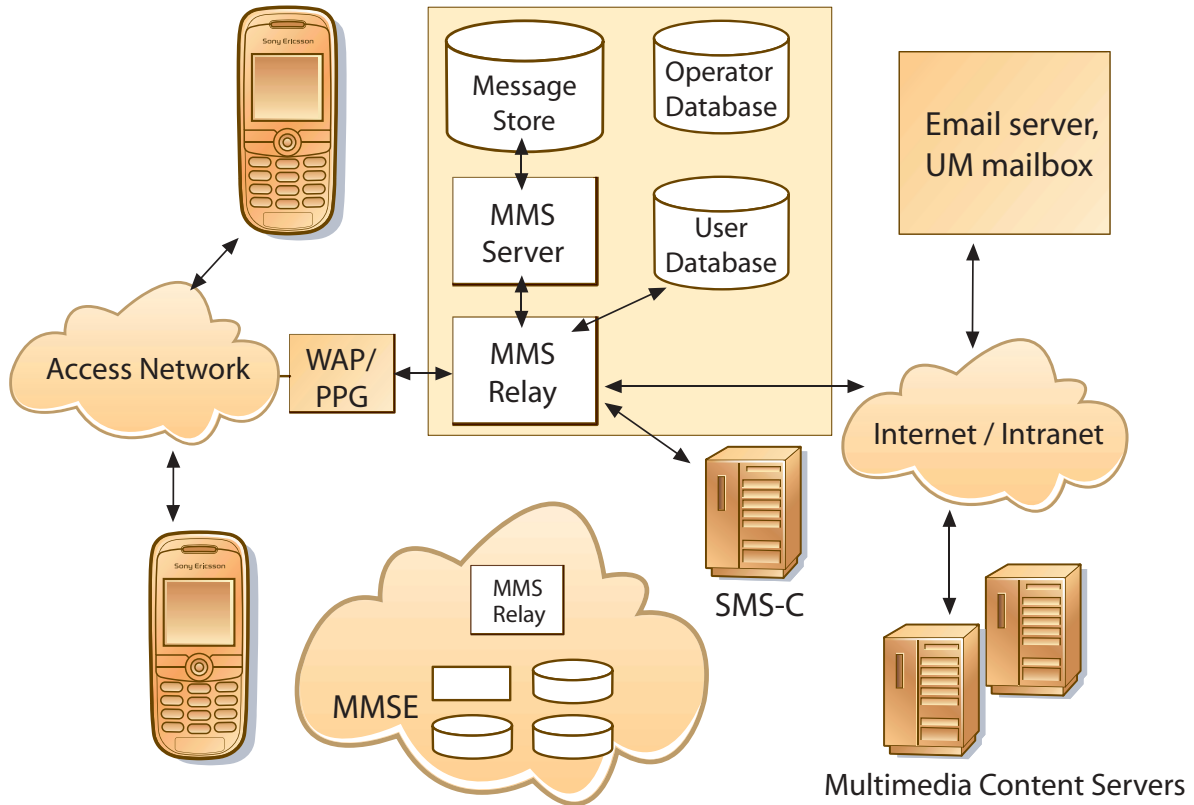


Figure 3. The architecture of MMS

Message conversion

The MMS-C is able to perform limited message conversion - for example, from MMS to SMS - so that processing and air time is not wasted in sending messages to mobile terminals that do not have adequate capability to receive them. It also handles service aspects such as store and forward, guaranteed delivery, subscriber preferences, operator constraints, and billing information. The MMS-C also vouches for high quality messaging, for example by format conversion.

This means that the MMS-C recognizes which formats are supported in the mobile phone, and adapts the MMS messages to these formats.

Connectivity

Memory Stick Duo™ & Memory Stick PRO Duo™



Memory Stick™ provides a convenient way of adding storage and other functions to a wide range of devices. The Z800i supports Memory Stick Duo and Memory Stick PRO Duo, miniature versions of the Memory Stick series which is just one third the volume of a standard Memory Sticks. Memory Stick Duo starts at 8 MB and has a roadmap which foresees sizes up to 1 GB. A 64 MB Memory Stick Duo is supplied with the Z800i.

When the Z800i is connected to a computer via a USB cable, the Memory Stick in the phone appears as a removable media drive in the file manager (USB Mass Storage), provided that the USB drivers on the PC software CD are installed.

Physical and electrical properties

The Memory Stick is very space-efficient. It is 20 mm wide, 1.6 mm high and 31 mm deep, with a volume of 992 mm³. The Memory Stick weighs 2 grams. The electrical contact consists of 10 pins in a structure which prevents direct touch, providing high reliability.

A serial protocol is defined for Memory Stick. This is optimized for the larger capacity memories that will be available in the future. Current maximum transfer speed is 2.45 MBps to read data and 1.8 MBps when writing data.

Wide industry support

Memory Stick is supported by a wide range of companies including major names in consumer electronics, computing, automotive, mobile phone, photographic and semiconductor sectors of industry. As of July 30th, 2003, 471 companies have declared support at www.memorystick.org.

Memory Stick compliant products include PCs, PDAs, digital cameras, portable music players, printers, projectors and entertainment robots. Future applications include home and car audio, game machines and multimedia kiosks.

Memory Sticks are currently marketed by Sony, SanDisk, Lexar Media, I-O Data Device Inc. and Apacer Technology.

As of March 2002, there were already over 20 million users of Memory Stick worldwide. (Source: www.memorystick.com).

PC and Apple Mac Support

PCs and Apple Mac computers may be enabled for Memory Stick via built-in Memory Stick slots, Floppy Disk adaptors, PC Card adaptors, USB adaptors and even a Memory Stick enabled mouse (Memory Stick Duo Adaptor required).

Memory Stick Duo vs. Memory Stick PRO Duo

The second generation of Memory Stick Media is called PRO – Memory Stick PRO Duo. PRO introduces new technologies and increased performance. The improvements include increased capacity and real-time recording.

Memory Stick Use Cases

Any number of Memory Stick units can be used with this phone, providing virtually unlimited storage opportunities.

Here are the main use cases:

- Additional storage for pictures taken with the integrated 1.3 Megapixel camera.
- Images from the integrated 1.3 Megapixel camera can be transferred to other image-aware devices such as PCs and printers.
- Transfer of data and media (sounds, pictures, video clips, documents etc) between the Z800i and a PC or Mac.
- Save data and media from the Z800i on to the Memory Stick, for example to make backup copies of important files.
- Transfer of data and media between phones which support the Memory Stick.

- Data can be transferred between a Memory Stick in the Z800i and a connected PC.
- Personalize the Z800i using media on the Memory Stick, for example pictures and sounds.
- Use media on the Memory Stick when composing MMS messages.

Specifically, the following built-in applications are enabled to work with the Memory Stick: Integrated 1.3 Megapixel camera, pictures, media player, email (attachments), MMS (media), browser, telephony (ringtones).

Compatibility with other Memory Stick devices

The Z800i follows the file system layout that is recommended by the Memory Stick organisation for pictures and sounds. This ensures interoperability with all devices following the same standard.

For devices that do not follow the same standard as Memory Stick Duo and Memory Stick PRO Duo, interoperability is possible by accessing the same folder structure. For a PC or Mac, this is easily done by browsing to the required folder on the Memory Stick. Memory Stick enabled devices that lack browsing capability may be unable to share data with the Z800i.

Bluetooth™ wireless technology

The Z800i features built-in Bluetooth wireless technology. Its Bluetooth power class 2, +4 dBm radio link, operates in the globally available 2.4 GHz radio frequency band, ensuring fast and secure communications up to a range of 10 metres, or even much more in ideal conditions. Please note that in the rather few countries where the use of Bluetooth wireless technology is not allowed, the Bluetooth function will be disabled. In countries where only lower output than 4 dBm or 0 dBm is allowed, the output is limited as a customized factory setting.

Bluetooth wireless technology facilitates instant connections, which are maintained even when the devices are not in the line of sight. Enhanced audio quality voice transmission is provided under adverse conditions, making it possible to use a headset connection to the Z800i at all times.

Using Bluetooth wireless technology in the Z800i

True wireless connection

Connect without cables to headsets, car handsfree equipment, computers/PDAs, digital still and motion video cameras and other devices.

Up to 16 added devices

The Z800i identifies and maintains up to 16 devices which are displayed in a list.

Radio link

No line of sight required; the phone can remain in a briefcase or in a pocket (whereas infrared requires line of sight).

Secure and fast

Data connection with a Bluetooth PC/laptop or PDA turns the phone into a modem for connecting to the Internet and for data transfer (faster than infrared or cable).

Synchronization

Fast synchronization, even without line of sight, of calendar, notes and phonebook with PC/laptop.

Business cards

Quick exchange of business cards, notes and calendar events with other phones and devices.

Imaging and music

Exchange still images and video clips with another mobile phone, a PC/laptop, and with a digital still and motion video camera. Use the Z800i as a modem to send pictures from a digital still and motion video camera to an imaging server.

Exchange music files with another mobile phone and a PC/laptop. Play MP3, MIDI sent by the phone.

Enable images to be shown on a TV or other display via an accessory, such as the Bluetooth™ Media Viewer MMW-100.

Audio quality

The Z800i uses an algorithm that repairs lost audio packets. When needed, a new packet is inserted with content based on previous packets. This, in conjunction with the high sensitive and high output power radio will enhance the audio quality compared to a standard Bluetooth device.

File sharing

By using the Server role of the File Transfer Profile, the phone enables the user to use a computer to manage content files that reside in the phone's file system or on the Memory Stick. Most computer Bluetooth applications provide an explorer like user interface for the file transfer service. When connecting to the phone, the computer application will show one folder for the content in the phone's file system and one folder for the content on the Memory Stick. In the phone memory folder, the same folders that the user can find under the My items icon on the phone's standby screen, i.e. Pictures, Sounds, Videos, Themes and Others. The content in the Games and more folder is not exposed in the file transfer server. Opening one of the folders will show a list of files related to that folder, e.g. images in the Pictures folder. Using the computer application the user can now: retrieve files from phone to computer, delete files from the phone and transfer files from the computer to the phone using the normal drag and drop mechanisms provided by the computer.

File browsing

By using the Client role of the File Transfer Profile, the phone enables the user to access file systems of other devices, that support the Server role of the same profile. After pairing the phone with the other device, the user can connect to the other device by selecting it in the list of My devices under the Bluetooth menu and selecting the Browse option that should be available on the left selection key. If the browse option does not appear, for example if pairing was initiated from the other device, the user can select the Service option to update the phone's knowledge that file browsing is possible with this device. When the phone is connected to the file server, the user can browse the shared folders and

retrieve files listed in the folders. The user can transfer files to the file server device using the normal Send/via Bluetooth option.

Media viewing

The phone can send images and sounds to a media viewer device, for example the MMW-100 TV adaptor accessory. The user can also conveniently run a slide show on the TV showing a set of nice phone camera pictures for family and friends. After selecting an image in the Pictures folder under the My items icon, the user can select the Remote screen option under More. The phone will then connect to a Bluetooth device that can receive images and when the user then selects View, the image is transferred to the remote screen and displayed. When the user then selects another image, that image is transferred to the remote screen and displayed.

Profiles

The following Bluetooth profiles are supported in the Z800i:

- Dial-up Networking Profile
- Generic Access Profile
- Generic Object Exchange Profile
- Object Push Profile
- Serial Port Profile
- Handsfree Profile
- Headset Profile
- Synchronization Profile
- Basic Imaging Profile
- File Transfer Profile
- Human Interface Device (HID) Profile

Remote control

By using the Bluetooth HID (Human Interface Device) Profile v1.0, the phone is able to act as a HID device. This means that when connected to a computer, the phone works like a combined keyboard and mouse. By assigning specific combinations of computer keyboard key presses to each key on the phone keypad, the user can use the phone as a remote control device for computer applications.

The phone keypad is configured for control of a certain computer application through a special type of HID configuration file consisting of an XML file for the keypad and an image for the display. HID configuration files can be downloaded into the phone using the normal file transfer mechanisms.

Users can even modify the files themselves on their computers. A few configuration files pre-loaded in the phone enable the user to navigate on a computer desktop and control presentations and media players.

System Functions

User Settings

The following keys can be configured through the HID configurations files: 0-9, #, * and volume up and volume down. For each of these keys, a UsageID from the HID usage tables can be assigned.

The navigational key and the two action keys are not configurable, they always provide functions for moving the mouse and performing right and left mouse clicks.

Characteristics

The HID configuration files, and the set of preloaded HID configuration files, are customizable. The configuration files can be modified by the user if transferred to, and opened on, a computer.

Used Enablers and bearers

The HID based remote control function works over Bluetooth. It is possible to download the HID configuration files via Bluetooth, IR or a cable as well as via WAP. It is also possible to transfer the files to another device using Bluetooth or infrared.

Power save mode

The phone uses sniff mode on headset, handsfree and HID connections which means reduced power consumption and shorter connection set-up times.

IrDA

IrDA (Infrared Data Association) is a point-to-point communication link between two infrared ports. The infrared beam has to be directed towards the target infrared port and as long as the two infrared ports are within sight and range, the devices can exchange data. For optimal performance, place the Z800i within 30 centimetres and at an angle of +/- 15 degrees to the infrared port on the PC/PDA, or other phone. An advantage of the necessary proximity of devices is reduced risk of transmitting data to other nearby devices.

An infrared link is a serial connection, which means that data bits are sent one after another in a long stream. The IrDA-SIR Data Link Standard is a protocol that makes transmission of data faultless. The standard provides a high level of noise immunity, which means that the connection is not affected by fluorescent light, sunlight and electromagnetic fields – making it suitable for the modern office environment.

Object Exchange via infrared (IrObex) supports transferring objects between compatible phones. These objects are not only limited to ring signals, but even pictures, bookmarks and other files.

Key benefits of using the Z800i with its built-in infrared transceiver:

- True wireless communication
- Low power consumption
- Secure data transmission with the IrDA DATA standard
- Ability to send and receive email and data on the connected PC/PDA
- Ability to connect to the Internet from the connected PC/PDA
- Ability to synchronize the phonebook from a PC
- Exchange of business cards and calendar events with vCard/vCalendar compatible devices
- Exchange of ringtones and other files between compatible phones
- Ability to attach a photo from a digital camera in outgoing email
- Ability to send and exchange notes with vNote compatibility devices

Connection via cable

The infrared connection is not always the best solution when connecting to a PC/PDA. Indeed, it is not always even possible. The DRS-11 cable provides connectivity between the phone and a PC with serial port (RS-232).

The DRS-11 cable supports a subset of the signals in the RS-232 standard.

USB

The Z800i is USB 2.0 (Universal Serial Bus) compliant. The bus is 12 Mbps and supports 63 devices. The idea of the USB is to allow easy connection of different devices, such as mobile phones, to personal computers. USB is designed to be “completely Plug and Play”, meaning that devices will be correctly detected and configured automatically as

soon as they are attached. USB in a mobile phone means convenient data transfer between the phone and a PC.

For example, in the Z800i, which has an integrated camera, pictures can be transferred from the phone to be stored in the PC. Music or short video clips can also be transferred from the PC to the phone, or vice versa.

Synchronization & Data Transfer

In everyday life, access to an updated calendar, notes and details of friends and business colleagues is greatly appreciated. To be truly mobile, users must be able to carry their important information with them. Equipping mobile phones with Personal Information Manager (PIM) programs like calendars, task lists and phonebooks gives users access to their most important data anywhere and anytime. The information is kept updated by synchronizing with the information at the office or at home. The growing use of groupware such as Microsoft® Outlook® means that more and more meetings are booked electronically in daily business life.

The Z800i uses the SyncML 1.1 protocol for synchronization. This means that it has compatibility to synchronize with a wide variety of devices over a number of different communications media.

To simplify the synchronization process, a number of new features are included in the phone.

The Automatic synchronization feature allows users to synchronize at regular intervals. The synchronization starts automatically and the users will have up-to-date information with a minimal amount of work.

After each synchronization, a log is created. The log lists relevant information about the synchronization process. For instance, the user can see how many bytes that have been received and transmitted during the synchronization or how many contacts and appointments that were synchronized.

The Z800i allows the synchronization server to present information to the user. For example, if the user tries to synchronize without having a valid account, information about this will be presented in the phone. Another example is situations where the user is required to pay a fee.

SyncML – An open standard for synchronization

SyncML Background

Leading the way in providing remote synchronization capability, Sony Ericsson realizes that interoperability of remote synchronization is of utmost importance if mobile data usage is to become as widespread as generally predicted. That is why Ericsson, along with IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software, founded the SyncML initiative in February 2000. Supported by more than 600 software and hardware developers, the SyncML initiative seeks to develop and promote a globally open standard for remote synchronization, called SyncML. Unlike many other synchronization platforms, SyncML is an open industry specification that offers universal interoperability. Because it uses a common language, called XML, for specifying the messages that synchronize devices and applications, SyncML has been called the only truly future-proof platform for enabling reliable and immediate update of data. The benefit for the end user is that SyncML can be used almost anywhere and in a wide variety of devices, regardless of application or operating system.

What is SyncML?

SyncML is the common language for synchronizing all devices and applications over any network. SyncML leverages Extensible Markup Language (XML), making SyncML a truly future-proof platform.

The Z800i uses SyncML for both local synchronization (for example, with a PC using Bluetooth or a cable connection) and remote synchronization over WAP and HTTP.

Designed for the wireless world

SyncML is designed specifically with the wireless world's tight requirements in mind. SyncML minimizes the use of bandwidth and can deal with the special challenges of wireless synchronization, such as relatively low connection reliability and high network latency. SyncML supports synchronization over WAP, HTTP or OBEX. As an open, future-proof standard, SyncML is the synchronization choice for any device or application of the mobile information society.

Benefits of a common synchronization protocol

End users

Today's user of mobile devices probably uses a different synchronization product with every device. Each technology can synchronize only a few applications, or is limited to a particular type of network connection. This arrangement is expensive to install, confusing to configure and operate, and costly to administer. With SyncML, users will be able to buy devices that synchronize with a broader range of data.

Device manufacturers

Device manufacturers will benefit from a common protocol that will make the device interoperable with a broader range of applications, services, and network and transmission technologies.

Service providers

Service providers moving into the growth arena of application hosting are particularly concerned that a proliferation of synchronization technologies will make it impossible to deploy and support their customers in a cost-effective manner. To support the range of data types and devices in use today, service providers must install and configure multiple server infrastructures, maintain and support that infrastructure, and maintain compatibility and performance. The alternative now available, to use a single solution for data connectivity, involves the risk of a tight coupling to a propriety solution. With SyncML, they will be able to provide connectivity to a wider selection of applications.

Application developers

Choosing to support multiple synchronization technologies enables an application to support more types of devices and networked data, but that choice comes at a cost. With SyncML, application developers will be able to develop an application that can connect to a more diverse set of devices and network data.

Network operators

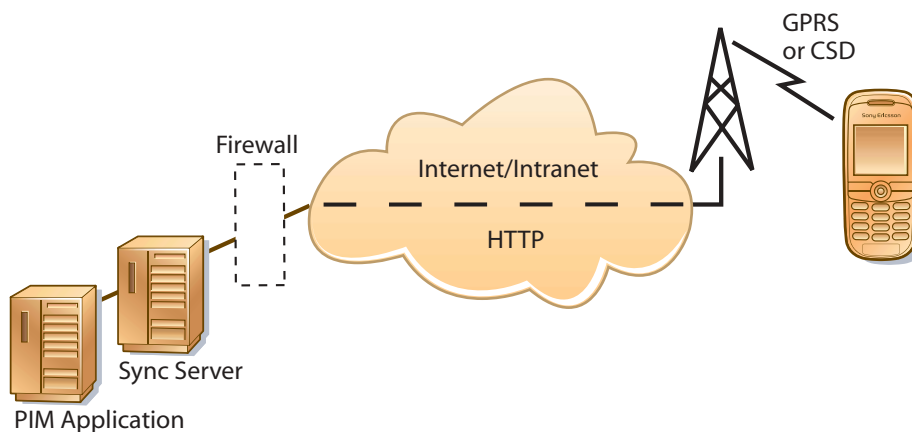
As multiple applications that need remote synchronization over WAP are developed, there will be an automatic growth of revenue for network operators.

What information can be synchronized in the Z800i?

Application	Remote sync	Local sync
Contacts	Yes	Yes
Calendar	Yes	Yes
Tasks	Yes	Yes
Notes	Yes	Yes

Remote synchronization

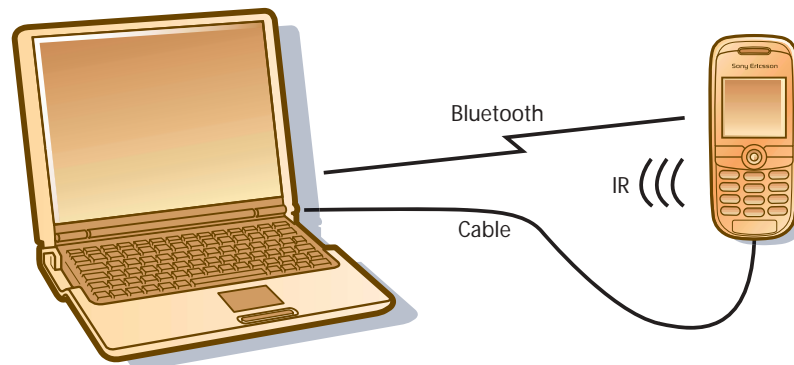
Remote synchronization takes place over the air using HTTP and is the ideal way to keep the Z800i up to date. GPRS enables a fast connection to the network - the synchronization can be started in seconds. A remote server can initiate a synchronization with the Z800i using WAP push.



Synchronization services will be offered by third-party service providers and as added capability to corporate PIM applications. Corporate PIM applications such as Microsoft® Exchange can be supplemented with SyncML capability.

Local synchronization

The Z800i is supplied with PC software for local synchronization. It may be loaded from the CD-ROM.



Bluetooth, infrared or cable

The Z800i always synchronizes using SyncML, regardless of connection type. It connects via Bluetooth wireless technology, infrared or cable. The cable is connected directly to the phone or via the desktop charger connector.

Intelligent process

A synchronization engine performs the task of synchronizing. For local synchronization, the synchronization engine is an application that runs on the desktop computer. The synchronization engine compares, updates and resolves conflicts to ensure that the information in the phone is the same as that in the computer.

Compatibility

The PC software, supplied with the phone, enables synchronization with the following applications:

- Microsoft® Outlook® Express 4.0, 5.x
- Microsoft® Exchange
- Microsoft® Outlook® 2000, 2002, 2003

The PC requirements are as follows:

- 120Mb free space on hard disk
- Microsoft® Windows® 2000, with SP3/SP4, 64MB RAM and 266 MHz
- Microsoft® Windows® ME, 64MB RAM and 200 MHz
- Microsoft® Windows® XP, 128MB RAM and 300 MHz
- Minimum recommended hardware configuration for the version of Windows in use.

File Transfer Utility

A utility is provided which enables files to be transferred to and from a Z800i connected to a PC. Typical uses for this include:

- Archiving pictures taken on the Z800i to PC storage
- Moving images to the Z800i to use in personalization, MMS messages etc.
- Moving sound clips to/from the Z800i for personalization.

DRM

Digital Rights Management, DRM, is a technology that enables secure distribution, promotion, and sale of digital media. Examples of such content include images, wallpapers and screen savers with themes from films, ringtones from musical artists, and branded games. In other words, content providers can control how users may use different types of content in devices, such as mobile phones, smartphones or PDAs. Content providers can also control the use of content in related services, such as MMS.

Sony Ericsson is actively focusing on technology standardization for the DRM concept, and supports the ongoing standardization work and activities of the OMA (Open Mobile Alliance). Sony Ericsson is fully committed to open standard solutions in the mobile environment and is a principal driver of many open standard initiatives. This will ensure the interoperability of mobile terminals in the DRM area and also result in a strong, competitive DRM standard.

How DRM works

The control of the content in digital media is executed by defining usage rights for the content. The usage rights give the content providers flexibility in the way they can publish and sell content. Rights can be defined so that a picture can be used by subscribers only, and rights can be defined so that a ringtone can be played only a limited number of times or for a limited period of time. Rights can also be defined so that the user is not able to forward content to other devices.

Packaging of rights and content

Rights and content can be packaged together and delivered to the device as one DRM package. As an alternative, content can be delivered to the device first, followed by the rights later being pushed to the device, for example via SMS. The kind of service and business model adopted by the content provider determines how the content and rights should be packaged and delivered to the device.

DRM packager

A DRM packager is typically included in the software used by the content provider. It is used to create the DRM package that is delivered to the

device, including content and associated rights. In the device, the content of the DRM package is made available to the user according to the rights. If the rights permit the user to play a ringtone ten times, the device will keep track of the number of times the ringtone is played, and notify the user when the ringtone has been used for the tenth time.

Protection properties

Content protection according to the OMA DRM standard gets special properties. Content with forward lock protection has the "Send to" option disabled, which prevents it from further distribution.

Unless the content is encrypted, the user cannot copy DRM content to other devices since the **Send to** option is disabled for pictures, ringtones, etc. that are OMA DRM protected. Content providers may choose to protect some content, but leave some content unprotected.

Package and delivery

The OMA DRM standard defines two ways to package and deliver rights and content to a device: combined or separated.

Combined delivery

Rights and content are packaged together into one DRM Package and delivered to the device. In the simplest case, no special rights are defined. The content is just put into a DRM package, thus protected from being copied out from the device by the user. This special case is called **forward-lock**. It is useful for all types of content that the provider wants to charge for.

Separate delivery

Rights are defined and sent in a push message. The content is encrypted and made available for users to download to their devices. The decryption key is put into the rights file. Since the content is encrypted, users cannot access it before the rights have also arrived to the device.

In this case, the content can be freely distributed on the network, only users with the rights file can access the content. Content providers can deliver the rights to the user using push technology.

Downloading servers and publishing servers

When using a mobile phone, the users do not have to be aware of the network architecture. During a content downloading session, typically many physical servers are involved. Sometimes transactions may take place between different companies' servers.

The actual content may be put on one server, the downloading server. The content can be reached, for example, through references from one or many other servers, the publishing servers. The content creator puts his or her content on the downloading server through an interface to the content provider.

The user navigates to the publishing server and selects the content, or rather a link to or description of the content. The content is then downloaded from the actual downloading server.

When content is downloaded to the device, operators generate revenues from the user via, for example, their billing system. Operators might in their turn be billed for rights by the content aggregator, content provider or directly by the content creator.

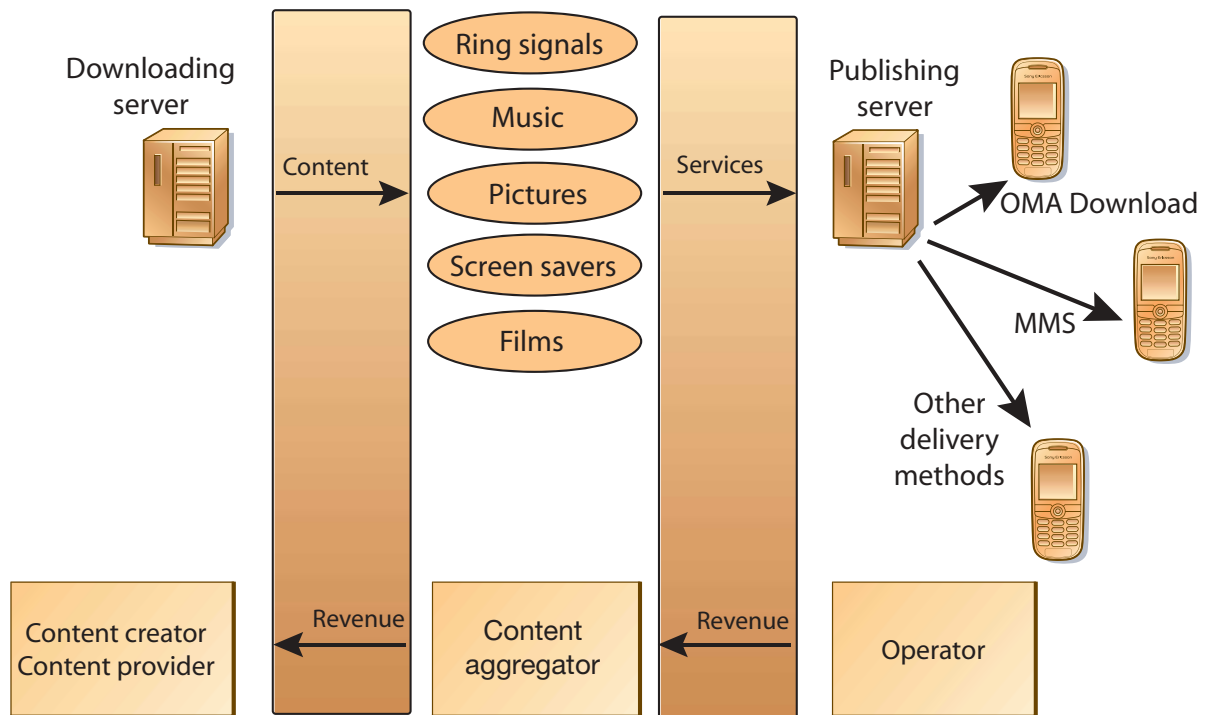


Figure 4. The flow of revenues and content. The content is viewed and selected from a publishing server and downloaded to the mobile phone from a downloading server. The revenue is in this case collected from the user by the operator and transferred to the content creator via the content aggregator.

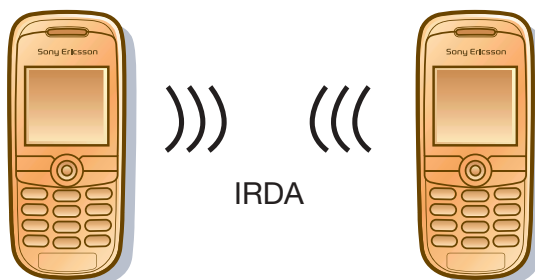
Object exchange – ‘Send As’

The Z800i makes it possible to transfer objects via Bluetooth, infrared and messaging. This is presented to the user via ‘Send as’ commands in applications. Simply select an item such as a contact, select ‘Send

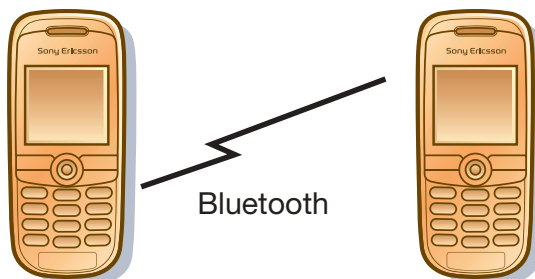
as' and select the method to be used for sending. Typical applications are to beam an appointment to other people, or to receive a new wallpaper.

Application	Bearer >	IR	Bluetooth	SMS	EMS	MMS	Email
Contact		Yes	Yes	Yes	Yes	Yes	No
Appointment		Yes	Yes	No	Yes	Yes	No
Tasks		Yes	Yes	No	Yes	Yes	No
Notes		Yes	Yes	No	Yes	Yes	No
Image		Yes	Yes		Yes	Yes	Yes
Sound		Yes	Yes		Yes*	Yes	Yes
Bookmark		Yes	Yes	Yes	Yes	Yes	Yes
Voice memo		Yes	Yes			Yes	Yes
Third party applications		No	No	No	No	No	No

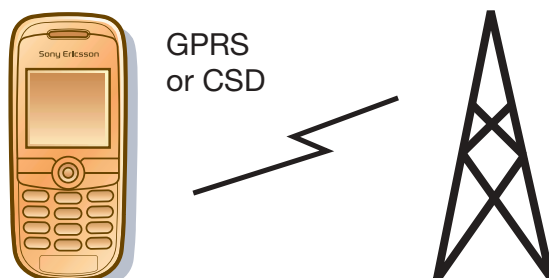
* Only an iMelody can be sent in an EMS.



To perform a 'Send as' beam operation using infrared, the two devices are lined up and the sender initiates the transfer.



To beam over Bluetooth, a scan finds the other activated (discoverable) devices within range. The user can then select the required device and send the information across.



When sending via SMS, MMS or email, the required message type is created with the selected object attached. It is then sent over the air.

Java™

Java 2 Micro Edition, J2ME™

The Z800i supports the Java 2 Micro Edition (J2ME). The following APIs are implemented in the handset:

- JSR 139 CLDC 1.1
- JSR 118 MIDP 2.0
- JSR 184 3D Graphics
- JSR 185 JTWI 1.0
- JSR 120 Wireless Msg API (the SMS part, not cell broadcast).

- The following functions of the JSR 135 Mobile Media API:

- Audio playback
- Video playback
- Camera snapshot

More information about the specific J2ME™ features support is available in J2ME™ Developers Guideline at Sony Ericsson Developer World www.SonyEricsson.com/developer/java

Java 3D™

The Z800i supports real-time 3D graphics rendering. This handset supports two different 3D graphics APIs:

- Mascot Capsule Micro3D Version 3
- Mobile 3D Graphics API for J2ME™ (JSR 184)

For more information about Java 3D on Sony Ericsson mobile handsets, refer to the Java 3D Developers Guidelines available at Sony Ericsson Developer World www.SonyEricsson.com/developer/java

Facts and figures

This chapter offers readers a detailed listing of all the technical data relating to the product. Comprehensive descriptions of performance and technical characteristics are presented in table format for quick and easy access.

Technical specifications

General technical data

Product name	Z800i
System	Tri-band GSM Release 99 recommendations. GSM 900 (CTR 19 and CTR 20), GSM 1800 (CTR 31 and CTR 32), EGSM and WCDMA FDD mode supported, GSM 1900 and e-GSM mode supported.
Speech coding	HR, FR, EFR, AMR supported where available, for high speech quality.
GSM SIM/ UMTS USIM card	GSM SIM - GSM 11.11, UMTS USIM - 3GPP™ TS 31.102. Small plug-in card, 1,8 V and 3 V.
Internal memory size	5 MB + 64 MB external.
Data transfer speeds	Up to 384 kbps (downlink). Up to 128 kbps (uplink).

Exterior description

Length	102 mm
Width	49 mm
Thickness (thinnest point/keypad area)	23,6 mm
Thickness (thickest point/display area)	23,6 mm
Weight	128 g
Graphic screen	Type: Full graphical Resolution: 176 x 220 pixels Technology: TFT Colours displayed together: 262,144 Backlight colour: White
External display	Type: CSTN Resolution: 80 x 101 Colours displayed: 65,536 Backlight colour: White
Antenna	Built-in
Colours	Titanium silver and linear silver.
Battery	900 mAh, Lithium Polymer.

Network LED	Yes
Keypad	4-directional + one select navigation key.

Performance and technical characteristics

Dimension	GSM 900/ E-GSM 900	GSM 1800	GSM 1900	WCDMA
Frequency range (MHz)	TX: 880 – 915 RX: 925 – 960	TX: 1710 – 1785 RX: 1805 – 1880	TX: 1850 – 1910 RX: 1930 – 1990	TX:1920 – 1980 RX:2110 – 2170
Channel spacing	200 kHz	200 kHz	200 kHz	5 MHz with 200 kHz channel rasters
Number of channels	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)	299 Carriers *8 (TDMA)	277
Modulation	GMSK	GMSK	GMSK	QPSK
TX Phase Accuracy	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	< 5° RMS Phase error (burst)	Error Vector Mag- nitude: <17.5%
Duplex spacing	45 MHz	95 MHz	80 MHz	190 MHz
Frequency stability	+/- 0.1 ppm	+/- 0.1 ppm	+/- 0.1 ppm	+/- 0.1 ppm
Voltage operation (nominal)	3.6 V	3.6 V	3.6 V	3.6 V
Transmitter RF power output	33 dBm Class 4 (2 W peak)	30 dBm Class 1 (1 W peak)	30 dBm Class 1 (1 W peak)	24dBm Class 3 (0.25 W peak)
Transmitter Output impedance	50 Ω	50 Ω	50 Ω	50 Ω
Transmitter Spurious emission	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to GSM spec)	< - 30 dBm (according to GSM spec.)	< - 30 dBm (according to GSM spec.)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™ spec)
Receiver RF level	Better than – 102 dBm	– 102 dBm	Better than – 102 dBm	Better than -106.7 dBm @ 12.2 kbps CS voice
Receiver RX Bit error rate	< 2.4%	< 2.4%	< 2.4%	< 0.1%

Current consumption, talk and standby times

Battery	Standard battery (LiPolymer) 900 mAh.
Charging time	At least 90% charged within 2 hours. Fully charged within 2.5 hours.
Talk time	Up to 10 hours (GSM) Up to 2.5 hours (WCDMA)
VideoTalk time	Up to 1.5 hours
Standby time	Up to 240 hours

Motion Eye™ camera – Megapixel camera and video call camera

Facts and figures	
Picture sizes (resolution) Megapixel camera	QQVGA (160 x 120 pixels) VGA (640 x 480 pixels) Megapixel (1280 x 960 pixels) QCIF (176 x 144 pixels) and SQCIF (128 x 96 pixels) - applicable only for video recording and telephony, not for still images.
Colour depth	24 bit (8 bit per RGB channel), 16.78 million colours
Camera memory	Using phone memory or Memory Stick.
Digital zoom	4x
Photo light	Yes

Media player

File Format	Video: MP4 (MPEG4 and AAC), 3GP (H.263 AMR and AAC) Audio: AAC, AMR, MP3, G-MIDI level 1 with 72 voices polyphony, WAV (up to 16 KHz sample-rate), XMF
Streaming transport	RTSP according to 3GPP™
Video decoding	MPEG-4 Simple Visual Profile Level 0 H.263 Profile 0 Level 10 H.263 Profile 3 Level 10
Audio decoding	AAC, AMR, MPEG layer 3
Features	Automatic loop of songs in folder. Automatic pause on telephone call.

Pictures

Formats	JPEG, BMP, GIF (including animated), PNG, WBMP, SVG-tiny
Sharing via	IR, Bluetooth, MMS, Email, PC file transfer, Memory Stick Duo, Memory Stick PRO Duo, USB

Image decoders

Decoder	Details	Size	Colour depth	File format
GIF	87a/89a			
JPEG	ISO/IEC JPEG <ul style="list-style-type: none"> Baseline DCT Progressive DCT Non-differential Huffman coding Symbol 'SOF2' 	Megapixel		<ul style="list-style-type: none"> JFIF v1.02 EXIF
BMP	The bitmap image format used by Windows®.	XRAM dependent, default is VGA.	24 bit	
WBMP				
PNG				

Image encoders

Decoder	Details	Size	Colour depth	File format
GIF	89a			
JPEG	ISO/IEC JPEG <ul style="list-style-type: none"> Baseline DCT Non-differential Huffman coding Symbol 'SOF0' 	Megapixel		JFIF v1.02
BMP	The bitmap image format used by Windows®.	XRAM dependent. Default is VGA.	24 bit	
WBMP				

Short message service

Feature	Support in the Z800i
SMS Centre Number	It is possible to pre-record the SMS Centre Number.
Pictures	It is possible to insert a picture or an icon into the text message. EMS compliant mobile handsets will be able to see the picture correctly.
Input methods	Predictive text input and multitap.
Reply to messages	It is possible to reply to received messages by MMS, SMS, phone call or Email.
Message creation methods support	Predictive writing and multitap.
Copy, cut and paste words	No
Teaching of predictive words that are not in the predictive dictionary	Yes
Possibilities when creating a message:	
save a sent message in a "sent items" folder	Yes
insert a line in the message	Yes
assign a validity period to the message	Yes
print via IrDA	No
use pre-defined messages	Yes
Possibilities when receiving a message:	
reply to the sender	Yes (only to the sender, not to all or part of the message recipients)
forward the message	Yes
save the message on SIM	Yes
get delivery time and date	Yes
print via IrDA	No
Possibilities of the previously sent message:	
delivery report of the message	Yes
forward the message	Yes
save the message on SIM	Yes
know the remaining capacity storage	Yes
print via IrDA	No
Possibilities of the previously received message:	

Feature	Support in the Z800i
reply to the sender	Yes (only to the sender, not to all or part of the message recipients)
save the message in the Inbox	Yes
forward the message	Yes
know the remaining capacity storage	Yes
Supported ways for replying to a received SMS:	
via SMS	Yes
via phone call (set up a call to the number contained in the message body)	Yes
via WAP call (go to the WAP address contained in the message body)	Yes
via USSD session	No
Possibility to offer the user the ability of sending an SMS to a list of recipients	Yes, using phonebook groups.
Possibility to write an email address as a recipient address	Yes, if SMS type=e-mail.
SMS storage	In the SIM and in the handset.
Nokia Picture Messaging	Yes

Enhanced message service

Feature	Support in the Z800i
Level of compliance supported by the handset regarding the specifications described in release 99.	Enhanced Messaging Service (EMS) according to the standard 3GPP™ TS 23.040 v4.3.0, with the addition of the ODI feature from 3GPP™ TS 23.040 v5.0.0.
Number of messages that the handset is able to handle to generate a concatenated message	10
Capacity storage	30 or more depending on space left on SIM.
Outgoing messages	It is possible to: <ul style="list-style-type: none"> • see how many short messages an EMS message consists of before sending it. • choose whether to send the message or not after writing it.

Feature	Support in the Z800i
Incoming messages	<ul style="list-style-type: none"> • A signal is heard once all parts of the message have been received or when a timeout occurs. • It is possible to re-use the content of an EMS message. Sounds, pictures, and animations can be inserted in a new message, if the object is not protected using ODI.
Concatenated messages	A receipt is received in the handset when all parts of a concatenated message have been delivered.
Insert objects	It is possible to add pictures, animations and sounds to an EMS message.
Text formatting	<ul style="list-style-type: none"> • Centred, left and right aligned text. • Small, normal and large font size. • Bold, italic, underlined and strikethrough style.
Sounds	Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low.
I-melody	Yes, version 1.2.
Melodies	<p>It is possible to:</p> <ul style="list-style-type: none"> • send and receive melodies via EMS, if the melodies are not protected by copyright. • download melodies and commercial tunes from WAP/WAP portals. • create melodies on WAP/WAP portals.
WBMP	Yes
Picture sizes	16 x 16 mm, 32 x 32 mm, variable size in black and white.
Pictures	<p>It is possible to:</p> <ul style="list-style-type: none"> • edit pictures by using the phone keypad. • send and receive pictures via EMS, if the pictures are not protected by copyright. • create pictures on WAP/WAP portals. • download pictures from WAP/WAP portals. • receive pictures in enhanced messages originated by service providers.
Animations	<p>The handset supports the following animations: I am ironic, I am glad, I am sceptic, I am sad, WOW!, I am crying. Plus the other nine animations defined in 23.040 v4.3.0.</p> <p>It is possible to send and receive animations.</p>
TP-PID field value given by the handset before sending an EMS message	0x00

Multimedia message service

Feature	Support in the Z800i
Support of MMS protocol stack version	1.1
MMS/CSD parameters and MMS/GPRS parameters placement	MMS is bound to a WAP profile. A WAP profile is bound to a Data Account. A Data Account contains either CSD parameters or GPRS parameters.
Possibility to pre-configure the MMS parameters in factory	<ul style="list-style-type: none"> • MMS/CSD: Yes • MMS/GPRS: Yes
Possibility to configure the MMS parameters by OTA provisioning	<ul style="list-style-type: none"> • MMS/CSD: Yes • MMS/GPRS: Yes
Possibility for all the parameters from the parameters set to be OTA provisioned at the same time	<ul style="list-style-type: none"> • MMS/CSD: Yes • MMS/GPRS: Yes
Possibility for only one parameter from the parameters set to be OTA provisioned	<ul style="list-style-type: none"> • MMS/CSD: No • MMS/GPRS: No
OTA provisioning solution	OTA specified by Ericsson and Nokia.
MMS User Agent functional entity will be a separate entity from WAP browser:	Yes
MMS User Agent support	WAP WTA, WAP UAProf and WTA Public.
Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers	Yes
Support of a standard or a proprietary procedure for OTA provisioning of MMS parameters	Proprietary
Functionalities that the user is able to set during message composition:	<ul style="list-style-type: none"> • message <i>subject</i> • MSISDN recipient address • <i>e-mail</i> recipient address • message Cc recipient(s) address(es) • <i>delivery report</i> request • <i>read-reply</i> report request • <i>message priority</i>
From where can the user insert multimedia elements into multimedia messages:	<ul style="list-style-type: none"> • terminal memory • directly from camera
Supplier indication if MMS User Agent will be able to handle a network-based address book	No
Possibility for sent messages to be memorized into a folder in handset memory	Yes

Feature	Support in the Z800i
Actions that the user can perform after message notification:	<ul style="list-style-type: none"> • retrieve the message immediately • defer message retrieval • reject message
Actions that the user can perform after message retrieval:	<ul style="list-style-type: none"> • reply to the sender of the message • reply to the sender and to Cc people • forward the message • delete the message • save message into terminal
Multimedia codecs/formats supported for audio	AMR, MP3, AAC, WAV
Multimedia codecs/formats supported for video	MP4, H263
Multimedia codecs/formats supported for image	Baseline JPEG, wbmp, SVG, GIF 89a
MMS User Agent provides:	<ul style="list-style-type: none"> • text formatting facilities (only text size) • coloured text/background (Viewer/player supports coloured text and background.) • predictive writing
Supported formats for message presentation:	<ul style="list-style-type: none"> • message body + attachments (email presentation) • SMIL version as described in "Nokia/Ericsson MMS Conformance" document (not WML and SMIL 2.0 Boston)
Maximum message size that can be handled by the handset for message	Content Class and Creation mode are applied. Also maximum size is possible to customize.
Maximum size of text objects	Maximum of 5000 characters per page.
Possibility to configure unconditional message modification (such as media modification in messages)	Yes
MMS User Agent will report problems to user in case of:	<ul style="list-style-type: none"> • message not sent causes no user subscription to service, if included in ResponseText (please see WAP209) • message not sent causes required functionality not supported by MMS Relay/Server, if included in ResponseText (please see WAP209) • message not sent causes insufficient credit (in case of prepaid charging), if included in ResponseText (please see WAP209)

Speech coding

Dimension	Full rate	Enhanced full rate
Type	RPE/LPC with LTP, AMR	ACELP, AMR

Dimension	Full rate	Enhanced full rate
Bit rate	13.0 kbps	12.2 kbps
Frame duration	20 ms	20 ms
Block length	260 bits	244 bits
Class 1 bits	182 bits	
Class 2 bits	78 bits	

Bluetooth technical data

Dimension	Support in the Z800i
Bluetooth capability statement	This phone is manufactured to meet Bluetooth Specification 1.1.
Bluetooth functions	Dial-up Networking Profile Generic Access Profile Generic Object Exchange Profile Headset Profile Object Push Profile Serial Port Profile Synchronization Profile Basic Imaging Profile Handsfree Profile File Transfer Profile Human Interface Device (HID) Profile
Connectable devices	All products supporting Bluetooth spec. 1.1 and at least one of the profiles above.
Coverage area	Varies due to radio performance on remote device and the occurrence of obstacles. Up to 10 metres (33 feet).
Transmission power	1.6 mW (2 dBm)
Frequency band	2.4 GHz - the unlicensed ISM band
Power consumption	GSM/UMTS host processor excluded: <ul style="list-style-type: none"> Standby, Bluetooth On mode: <0.6 mA Voice mode: 24 mA Data mode average: 25 mA
Data transmission rate	Up to 600 kbps asynchronous and up to 350 kbps synchronous from an application level.
Specific commands working with the SIM card	No

SIM AT services supported by the Z800i

Service	Mode	Support
CALL CONTROL		Yes
CELL BROADCAST DOWN-LOAD		Yes
DISPLAY TEXT	Text of up to 240 characters (120 UCS2 coded).	Yes
	bit 1: 0 = normal priority	Yes
	1 = high priority	Yes
	bit 8: 0 = clear message after a delay	Yes
	1 = wait for user to clear message	Yes
GET INKEY	General: The GET_INKEY requires that the user confirms his/her choice	Yes
	bit 1: 0 = digits (0-9, *, # and +) only	Yes
	1 = alphabet set	Yes
	bit 2: 0 = SMS default alphabet	Yes
	1 = UCS2 alphabet	Yes
	bit 3: 0 = character sets defined by bit 1 and bit 2 are enabled	Yes
	1 = character sets defined by bit 1 and bit 2 are disabled and the Yes/No response is requested	Yes
GET INPUT	General: No. of hidden input characters	20
	bit 1: 0 = digits (0-9, *, # and +) only	Yes
	1 = alphabet set	Yes
	bit 2: 0 = SMS default alphabet	Yes
	1 = UCS2 alphabet	Yes
	bit 3: 0 = ME may echo user input on the display	Yes
	1 = user input not to be revealed in any way (see note)	Yes
	bit 4: 0 = user input to be in unpacked format	Yes
	1 = user input to be in SMS packed format	Yes
	bit 8: 0 = no help information available	Yes
	1 = help information available	No
LAUNCH BROWSER		Yes
MORE TIME		Yes
PLAY TONE		Yes

Service	Mode	Support
POLLING OFF		Yes
POLL INTERVAL		Yes
PROVIDE LOCAL INFORMATION	'00' = Location Information (MCC, MNC, LAC and Cell Identity)	Yes
	'01' = IMEI of the ME	Yes
	'02' = Network Measurement results	Yes
	'03' = Date, time and time zone (DTTinPLI)	Yes
	'04' - Language setting	Yes
	'05' - Timing setting	Yes
REFRESH	General: The reset option requests the user to wait while the phone restarts.	Yes
	'00' =SIM Initialization and Full File Change Notification	Yes
	'01' = File Change Notification	Yes
	'02' = SIM Initialization and File Change Notification	Yes
	'03' = SIM Initialization	Yes
	'04' = SIM Reset	Yes
SELECT ITEM		Yes
SEND DTMF		Yes
SEND SHORT MESSAGE	bit 1: 0 = packing not required	Yes
	1 = SMS packing by the ME required	Yes
SEND SS		Yes
SEND USSD		Yes

Service	Mode	Support
SET UP CALL	General: Capability configuration	Yes
	Set-up speech call CallParty	No
	Subaddress DTMF support	No
	'00' = set up call, but only if not currently busy on another call	Yes
	'01' = set up call, but only if not currently busy on another call, with re-dial	Yes
	'02' = set up call, putting all other calls (if any) on hold	Yes
	'03' = set up call, putting all other calls (if any) on hold, with re-dial	Yes
	'04' = set up call, disconnecting all other calls (if any)	Yes
	'05' = set up call, disconnecting all other calls (if any), with re-dial	Yes
SET UP EVENT LIST	'00' = MT call	Yes
	'01' = Call connected	Yes
	'02' = Call disconnected	Yes
	'03' = Location status	Yes
	'04' = User activity	Yes
	'05' = Idle screen available	Yes
	'06' = Card reader status	Not Applicable
	'07' = Language selection	Yes
	'08' = Browser termination	Yes
	'09' = Data available	No
	'0A' = Channel status	No
SET UP IDLE MODE TEXT		Yes, 1 row of text is supported
SET UP MENU		Yes
SMS PP DOWNLOAD		Yes
TIMER MANAGEMENT		Yes
OPEN CHANNEL		No
CLOSE CHANNEL		No

Service	Mode	Support
RECEIVE DATA		No
SEND DATA		No
GET CHANNEL STATUS		No

User Interaction with SIM AT

Display text

Text of up to 240 characters (120 UCS coded) is supported.

Text clearing times are 5-20 seconds and a 60-second time-out limit for the user to clear the text.

'Key' responses:

- 'Long Back' – Proactive session terminated by user.
- 'Back' – Backward move in proactive session.

Any other key clears screen if the command is performed successfully.

Get inkey

Prompt for a one-character input. Pressing 'Ok' without entering a character gives warning message "Minimum characters:1". 'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

Get input

Prompt for character input. The phone will refuse to accept further input when maximum response length is exceeded. MMI Maximum Response lengths:

- Digits Only – 160 characters
- SMS default alphabet characters – 160 characters
- UCS2 alphabet characters – 80 characters
- Hidden Characters (digits only) – 20 characters

'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.

- 'OK' – Command performed successfully.

Refresh

When a refresh command is executed by the phone, it requests the user to wait while the phone restarts. A notification will be made if it is demanded that the SIM card initializes again.

Select item

Scroll to highlight item for selection. 'Key' responses:

- Joystick press down – Scroll down list.
- Joystick press up – Scroll up list.
- Long 'Back' terminates proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

Send short message

Default message "Sending message" can be replaced for the Alpha Identifier text, or suppressed completely if a null text is provided. Default responses are "MESSAGE FAILED" or "MESSAGE SENT". 'Key' responses:

- Long 'Back' or 'Back' ends the proactive session.

Set up call

If the ME is on a call when the command 'Set up Call', 'putting all other calls on hold' is sent, the user will see the text 'Setting up a call current call will be held'. If 'OK' is pressed the current call will be put on hold and the new call set up. If the ME is on a call when the command 'Set Up Call, disconnecting all other calls' is sent, the user will see the text 'Setting up a call current call will be disconnected'. If the 'OK' key is pressed the current call will be disconnected and the new call set up.

Set up menu

Incorporates a SIM Application Toolkit Menu Item into the ME's Connectivity menu. The navigation key can be used to select the Menu Items.

If an Alpha Identifier is supplied in the Set Up Menu command, this is used as the SIM AT entry in the ME's main menu. If no alpha identifier is supplied and several items are found in the menu, a default title is used. If the SIM AT Menu Item is selected by pressing 'Select', all the items sent in the Set Up Menu command will be available for selection, in the same way as the Select Item command.

Web browser technical data

Feature	Support in the Z800i browser
Back to previous page	Yes
Bearer type GPRS (IP)	Yes
Bearer type GSM Data (IP)	Yes, ISDN and analog
Bookmarks	Yes, up to 25 named bookmarks for easy access to frequently visited pages.
Bookmark Export/Import	Yes, can be sent and received as link using SMS and vBookmark format via IR and BT.
Cache	Yes (size 300 KB)
Character sets *	UTF-8 (Default), UTF-16, USASCII, Latin1, UCS2
Clear cache	Yes
Colour	Colour display
Home page	Yes, up to 5 different, one for each Internet profile.
HTML version for Web browser	xHTML, mobile profile
Hyperlinks in Text	Yes, highlighted by inverse video.
Hyperlinks in Images	Yes, indicated by a frame.
Image Animation	No
Image Formats	GIF (interlaced and non-interlaced) WBMP, no transparent layers, JPEG, PNG
Network Settings	Up to 5 different settings available by selecting Internet profile (Intranet, Internet, Banking, Gateway etc.).
OTA Support	Yes
PPP Authentication	PAP, CHAP supported
Reload page	Yes

Feature	Support in the Z800i browser
Security	WTLS class 1-3 TLS 1.0 and SSL 3.0, client authentication WIM X.509 certificate support, WAP Profile WMLScript signText WPKI download of certificates Root certificates in the provisioning areas of the SIM/USIM
Tables	Yes
User Agent Profiles	Yes, list of client characteristics - for example display size.
WAP/WML WAP	WAP 2.0/WML 1.3
	*) When creating WML applications, it is recommended that you always save the page contents as UTF-8, and that this is clearly indicated in the pages before publishing. This ensures that the contents of the application can be viewed, regardless of character sets used in gateways and the phone. All characters are not supported in all phones. The software version depends on which market the phone is associated to. Also, please note that the phone may not support input on a WAP Service which uses certain characters (languages), even if those characters are supported for browsing in the phone.
Web browser	SEMC-Browser 4.1
Internet profiles	Dynamic - up to 5 Internet profiles, each with its own settings.

WAP operator technical data

Feature	Support for WAP	
WAP Browser		
Version	2.0 baseline	
HTML	XHTML, mobile profile	
WAP Provisioning	The Ericsson-Nokia OTA solution	WAP Forum OTA provisioning (v1.1)
Total Parameter sets	10 (shared between the WAP provisioning types) > or =10 (total number of WAP profiles)	

Feature	Support for WAP	
Parameter set list	name, homepage and homepage title (1st bookmark element), proxy/GW address, bookmarks (remaining bookmark elements), CSD phone number, CSD data rate, CSD dial type, GPRS APN, protocol authentication, GW authentication, secure connection on/off	name, homepage, proxy/GW address, CSD phone number, CSD data rate, CSD dial type, CSD response timer, GPRS APN, protocol authentication, GW authentication, GPRS QoS
Parameter sets include	WAP/CSD, WAP/GPRS (different sets)	
Factory pre-configuration	WAP/CSD (possibility to lock a setting), WAP/GPRS	
OTA	WAP/CSD, WAP/GPRS configuration possible	
Security mechanism		
Bearer	The Ericsson-Nokia solution	WAP Forum OTA provisioning
OTA via SMS	Operator verification through a code that can be included in the OTA configuration data. This code is shown to the user who can choose installation or not.	Uses security mechanism (SEC) methods according to OMA client provisioning 1.1 (see www.openmobilealliance.org).
Interface		
Bearer	The Ericsson-Nokia solution	WAP Forum OTA provisioning
OTA via SMS	A question whether to install, with the code if available is asked. The user may have to choose if to create a new WAP profile or to replace an existing WAP profile.	For NETWPIN the user is asked to accept to install received settings. For USERPIN, USERNETWPIN and USERPINMAC the user is subsequently asked to enter a PIN code that is a shared secret between the service provider and the user.
Re-provisioning Interface		
	The Ericsson-Nokia solution	WAP Forum OTA provisioning

Feature	Support for WAP	
OTA via SMS	The Ericsson-Nokia solution	If the settings previously installed were privileged or has higher priority the settings might not be possible to install again unless the terminal is reset, otherwise as above.
Carrier reset/provisioning	Yes, but not if the set is pre-configured in the factory and locked.	
Applicative provisioning		
Preferred bearer customization	Yes	
Email customization	Yes, but not through WAP provisioning.	
Other applications/features	Yes, MMS and SyncML.	
Technologies		
WAP Forum OTA provisioning	Yes, WAP provisioning v1.1.	
Openwave OTA	No	
Other	Yes. The Ericsson-Nokia solution OTA Settings v7.0.	
Provisioning bearer	SMS	
Parameter sets available	< or = 10 (total number of WAP profiles)	
Parameter sets for OTA modification	< or = 10 (total number of WAP profiles)	
PUSH		
Content types		
Service Indication (SI)	Yes	
Service Loading (SL)	Yes	
Cache Operation (CO) content type	Yes	
Session Initiation Application (SIA)	Yes	
Man Machine Interface		
SI/content retrieval postponing	Yes	
SI menu structure accessibility	Messaging, Inbox	
SL reception warning	The user can make a choice if a dialogue is wanted or not before loading the SL. Messaging/Settings/Push messages/Allow push msg/Always ask	
SIA reception warning	Yes	

Feature	Support for WAP
Cache size limitations	If the inbox is full and a new push is received, the oldest push in the inbox will be discarded.
Number of push messages	Depending on the size of the push messages. Around 20 push messages with a size of 500 bytes can be stored.
Push de-activate	Yes. Messaging/Settings/Push.
Dynamic push menu changes	No. There are no changes in the menus when activating/deactivating push.
Security	
Mechanisms for push	None
Trust with PPG	Sending a SIA is the most trustful.
WSP push sessions	1
Denial of service/spoofing	
User agent profile	
UA profile content sent at beginning of WSP session	No
OA profile content size	
URL sent pointing to the UA profile at the beginning of WSP session	Yes
URL location	On the manufacturer WAP site.
WTAI	
WTA Make Call	Yes
WTA Send DTMF	Yes
WTA Add Phone Book	Yes
Other WTA/WTAI	No
DOWNLOAD	
WAP solutions	
SAR/WSP/HTTP GET solution to download content over WAP	Yes
Download Fun from Openwave	No
Other download content over WAP	Yes. Content download limited to 200 KB when using WTP protocol. No download limit when using HTTP protocol.
Features	
Download application/product memory check	Yes

Feature	Support for WAP
Downloaded object solution	Yes. The user is asked if the content is to be saved.
UAP indication for downloading	Yes
Other features	Yes. Store, delete, forward, use, manage.
Object formats	
Ringtones	audio/iMelody, other/eMelody, vMel.
Wallpapers	Image/WBMP, GIF, JPEG.
Pictures	Image/WBMP, GIF, JPEG, PNG.
Games	Yes
JAVA games and applications	Yes
Screen savers	Image/GIF, JPEG
Audio files	WAV not used
Skins	Application/skin
Video	
GRAPHICAL USER INTERFACE	
Man Machine Interface	
Selection keys	Yes
Separate/dedicated back or erase keys	Yes
Screen backlight on when browsing	Yes
Predictive writing	Yes
“http://” string displayed automatically when entering URLs	Not displayed, but the “http://” is added automatically to the URL.
Elements	
Number of display lines for a Web page	4 to 7 plus Title.
Pop-up menus	Yes, in XHTML
Radio buttons	Yes, in XHTML.
Check boxes	Yes, in XHTML.
Buttons	Available as XHTML form controls.

USSD technical data

Feature	Support in the Z800i
USSD support	GSM Phase 1/2 (Cross-phase compatibility). GPRS behavior according to class B.
Mode support -mode	MMI-mode supported. SAT initiated USSD supported.
MMI-mode details	<ul style="list-style-type: none"> • USSD messages disappear after time out. • It is possible to scroll the text up and down in USSD messages. • It is possible to highlight embedded numbers and take actions accordingly.

GPRS technical data

Dimension	Support in the Z800i
Compatible GPRS and SMG specifications	3GPP™ R99 December 2002
Data rates	Multislot class 8 supported (4+1) CS-1, CS-2, CS-3, CS-4 9,050 bps, 13,400 bps, 15,600 bps, 21,400 bps supported (network-dependent)
Medium Access Modes	Fixed and dynamic allocation.
Support of Packet Control Channels (PBCCH/PCCCH)	Yes, available at launch.
Network operation mode	NOM I, II, III
Support of GPRS/CS combined procedures	Yes
Network control mode	NC0, 1 and 2
Support of access in 2 phases	Yes
Support of PRACH on 11 bits	Yes
Support of GPRS re-selection C31/C32	Yes
Support of static and dynamic addressing	Yes
Support of power control Uplink and Downlink	Uplink = yes. Downlink is a network feature.
Support of ciphering algorithms	GEA1, GEA2

Dimension	Support in the Z800i	
Support of compression algorithms	Yes, V42bis and IP header compression.	
Mode of operation	Class B and Class C modes of operation supported.	
R Reference point	Physical layer: Support of RS232 PPP is supported as L2 layer in the R reference point Authentication algorithms PAP, CHAP supported	
IP connectivity	PDP type IP is supported. IP termination in mobile or TE (laptop, PDA) supported.	
PDP context	10 PDP context descriptions stored in mobile. PDP context description is edited via application in mobile, AT-command or via OTA. Simultaneous PDP contexts are supported.	
SIM	GPRS aware, as well as non-GPRS aware; SIM cards are supported.	
AT commands supported	AT+CGDCONT - DEFINE PDP CONTEXT AT+CGQREQ - Quality of Service Profile (REQUESTED) AT+CGQMIN - Quality of Service Profile (Minimum Acceptable) AT+CGATT - PACKET DOMAIN SERVICE ATTACH OR DETACH	AT+CGACT - PDP CONTEXT ACTIVATE OR DEACTIVATE AT+CGDATA - ENT

SyncML technical data

Feature	Support for Sync ML in the Z800i
SyncML compliance	The handset is fully SyncML compliant (it passed SyncML Conformance testing).
Basic data formats	Contacts: vCard 2.1, Calendar: vCalendar 1.0, Tasks: vTodo 1.0, Notes: text/plain.
Possibility for operators to extend SyncML functionality	No
Possibility to synchronize other handsets using SyncML	No
Transport method for SyncML messages	WSP (i.e. using a WAP connection), HTTP, OBEX (RS232, IR, USB, Bluetooth).
Synchronization application placement	Inside the handset

Feature	Support for Sync ML in the Z800i
Possibility for the user to configure login parameters (e.g. username and password) to access the remote database	Yes
Configuration parameters that can be entered/modified by the user	Server URL, Server UserID, Server PWD, Paths to databases (Calendar, Contacts, Tasks) UserID and PWD for Databases, Databases to be synched (on/off), WAP Account, Sync Interval (hours).
Mechanisms used by the handset to capture changes made by the end user (i.e. how does the SyncML client in your handset know which changes were made to the address book)	It uses a change log where it marks the contact as updated.
Ability to deal with multiple servers	Yes
Ability to perform conflict resolution actions	No

Terminology and abbreviations

3GPP™

3rd Generation Partnership Project.

AMR

Adaptive Multi Rate. Audio format for speech sounds.

API

Application Programming Interface.

Bearer

The method for accessing WAP from the phone, for example GSM Data (CSD) and SMS.

Bookmark

A URL and header/title stored in the phone.

Browsing session

The period from the first access of content until the termination of the connection.

Calling Line Identification (CLI)

Shows the number of the caller, or a picture assigned to the number of the caller in the mobile phone display. Not all numbers can be displayed. Network-dependent service.

Card

A single WML unit of navigation and user interface. May contain information to present to the user, instructions for gathering user input, etc.

CDMA

Code Division Multiple Access. A generic term that describes a wireless air interface based on code division multiple access technology.

CS

Circuit Switched.

CSD

Circuit Switched Data.

Deck

A collection of WML cards.

DRM

Digital Rights Management; controlling copying and distribution of contents, with respect to intellectual property rights.

DTMF or Touch Tone

Dual Tone Multi-Frequency signal – codes sent as tone signals. Used for telephone banking, accessing an answering machine, etc.

Dual band

GSM 900/1800.

e-GSM

Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM's core 900 frequency band. This extension gives increased network capability.

EDGE

Enhanced Data rates for Global Evolution. EDGE uses a new modulation schema to enable data throughput speeds of up to 384kbps using existing GSM infrastructure.

EFR

Enhanced Full Rate, speech coding.

EMS

Enhanced Messaging Service. Allows the user to add simple pixel pictures and animations, sounds and melodies to a text message. The EMS 3GPP™ standard also includes text formatting.

ETSI

European Telecommunications Standards Institute.

FR

Full Rate, speech coding.

Gateway

A WAP Gateway typically includes the following functions:

- A Protocol Gateway – the protocol gateway translates requests from the WAP protocol stack to the WWW protocol stack (HTTP and TCP/IP).
- Content Encoders and Decoders – the content encoders translate Web content into compact encoded formats to reduce the size and number of packets travelling over the wireless data network.

GIF

Graphics Interchange Format.

GPRS

General Packet Radio Services.

GSM

Global System for Mobile Communications. GSM is the world's most widely-used digital mobile phone system, now operating in over 100 countries around the world, particularly in Europe and Asia-Pacific.

GSM system

The GSM system family includes GSM 900, GSM 1800 and GSM 1900. There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1800

Also known as DCS 1800 or PCN, this is a digital network working on a frequency of 1800 MHz. It is used in Europe and Asia-Pacific.

HR

Half Rate, speech coding.

HTML

HyperText Markup Language.

HTTP

HyperText Transfer Protocol.

IrMC

Infrared Mobile Communications standard.

IrDA

Infrared Data Association.

ISP

Internet Service Provider.

ITTP

Intelligent Terminal Transfer Protocol.

LED

Light Emitting Diode.

LAN

Local Area Network.

ME

Mobile Equipment.

Micro browser

Accesses and displays Internet content in a mobile phone, using small file sizes and the bandwidth of the wireless-handheld network.

MMI

Man-Machine Interface.

MP3

Short for "MPEG layer 3", an effective audio coding scheme.

MS

Mobile Station.

MT

Mobile Termination.

ODI

Object Distribution Indicator.

OMA

Open Mobile Alliance.

OTA

Over-the Air Configuration. To provide settings for the phone by way of sending an SMS message over the network to the phone. This reduces the need for the user to configure the phone manually.

PDA

Personal Digital Assistant.

PDP

Packet Data Protocol.

Phonebook

A memory in the mobile phone or SIM card where phone numbers can be stored and accessed by name or position.

PIM

Personal Information Management.

SMS-C

Service Centre (for SMS).

Service provider

A company that provides services and subscriptions to mobile phone users.

SI

Service Indication.

SL

Service Loading.

SIM card

Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile phone. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. The Z800i uses the small plug-in card.

SMS

Short Messaging Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

SS

Supplementary Services.

TCP/IP

Transmission Control Protocol/Internet Protocol.

UMTS

Universal Mobile Telecommunications System. The telecommunications system, incorporating mobile cellular and other functionality, that is the subject of standards produced by 3GPP™.

URL

Uniform Resource Locator.

The global address of documents and other resources on the World Wide Web.

USSD

Unstructured Supplementary Services Data.

vCard

vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as Internet mail, voice mail, Web browsers, telephony applications, call centres, video conferences, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

WAP

Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presentation of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

WAP Application

A collection of WML cards, with the new context attribute set in the entry card.

WAP service

A WML application residing on a web site.

WBMP

Wireless BitMap.

A graphic format optimized for mobile computing devices.

WML

Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

WMLScript

WMLScript can be used to enhance the functionality of a service, just as, for example, Java Script may be utilized in HTML. It makes it possible to add procedural logic and computational functions to WAP-based services.

WSP

Wireless Session Protocol.

WTLS

Wireless Transport Layer Security.

WWW

World Wide Web.

XML

Extensible Markup Language.

XHTML

Extensible HyperText Markup Language.

Related information

Documents

- The Z800i User Guide
- Sony Ericsson Z800i FAQ
- AT Command Reference Manual
- WAP 2.0 Specifications

Links

- www.SonyEricsson.com
- www.SonyEricsson.com/fun/
- www.SonyEricsson.com/developer/
- www.SonyEricsson.com/support
- www.ericsson.com/mobilityworld/
- www.midi.org
- www.extendedsystems.com
- www.bluetooth.com
- www.imc.org
- www.3gpp.org
- www.irda.org
- www.etsi.org
- www.wapforum.org
- www.imc.org/pdi/
- www.syncml.org
- www.w3.org/TR/SVGMobile/
- www.w3.org/TR/xhtml1-basic/
- www.memorystick.org
- www.memorystick.com
- www.java.sun.com

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